

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of

Date: Nov. 17, 2009

Applicants: Bednorz et al.

Docket: YO987074BZ

Serial No.: 08/479,810

Group Art Unit: 1751

Filed: June 7, 1995

Examiner: M. Kopec

Appeal No. 2009-003320

For: NEW SUPERCONDUCTIVE COMPOUNDS HAVING HIGH TRANSITION  
TEMPERATURE, METHODS FOR THEIR USE AND PREPARATION

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**REQUEST FOR REHEARING  
UNDER  
37 C.F.R. § 41.52 (a)(I)  
Of  
Decision on Appeal dated 09/17/2009**

Sir: Please consider the following.

Pursuant to 37 C.F.R. § 41.51 (a)(1) appellants request rehearing  
of the Decision on Appeal dated 09/17/2009 (Board's Decision).

**PART 2  
PAGES 61 TO 136**

discovery methodology of scientists" as a comment on or criticism of the News Affidavit.

The following language is quoted from BV1 page 114, lines 23-27:

The Examiner has provided no reason for why the 1.132 Declarations of Mitzi, Tsuei, Dinger and Shaw (Brief Attachments AH, AI, AJ, AK and AL) are not persuasive and the Examiner has made no comment on the DST Affidavits (Brief Attachments AM to AO) or the declaration of Bednorz (Brief Attachment AQ) or the Affidavit of Newns (Brief Attachment AQ [sic, AP]).

Appellants' Reply states at page 5, lines 4-5, "[t]he Examiners' Answer is essentially verbatim copied from the Office Action dated 07/28/2004 and the Final Action." Thus the Examiner's Answer adds no new facts, decisions or augments not found in the Total Final Action.

Thus for the first time in the prosecution of the present application there is a comment and criticism of the News Affidavit (Brief Attachment AP). Appellants should not be required to respond in a Request for Rehearing to comments on, criticisms of and notations of deficiencies that have been made for the first time in the Decisions on Appeal. These comments should have been made by the Examiner in prosecution and to the extent that they are being made in the Decision on Appeal, the Board is acting as an examiner and not in its appellate capacity. In view thereof Appellants request that their Request to Reopen Prosecution be granted. Because the Board has introduced arguments, comments on, criticisms of and notations of deficiencies in the News Affidavit (Brief Attachment AP), Appellants are compelled to introduce rebuttal comments. Attached to this rehearing is a rebuttal affidavit of Dr. News. It will be designated ATTACHEMENT BN which is next Attachment designation after the Attachment previously submitted with RB3.

**21. Section  
Dr. News Affidavit (Attachment BN)**

Paragraph 3 of Dr. News new affidavit states:

In my prior affidavit I commented on the USPTO response dated October 20, 2005 (Office Action) which at page 4 regarding the subject application cites Schuller et al "A Snapshot View of High Temperature Superconductivity 2002" (report from workshop on High Temperature Superconductivity held April 5-8, 2002 in San Diego) which the examiner states "discusses both the practical applications and theoretical mechanisms relating to superconductivity."

Paragraph 4 of Dr. News new affidavit states:

As stated in paragraph 4 of my Prior Affidavit the Examiner at page 4 of the Office Action cites page 4 of Schuller et al which states:

"Basic research in high temperature superconductivity, because the complexity of the materials, brings together expertise from materials scientists, physicists and chemists, experimentalists and theorists... It is important to realize that this field is based on complex materials and because of this materials science issues are crucial. Microstructures, crystallinity, phase variations, nonequilibrium phases, and overall structural issues play a crucial role and can strongly affect the physical properties of the materials. Moreover, it seems that to date there are no clear-cut directions for searches for new superconducting phases, as shown by the serendipitous discovery of superconductivity in  $\text{MgB}_2$ . Thus studies in which the nature of chemical bonding and how this arises in existing superconductors may prove to be fruitful. Of course, "enlightened" empirical searches either guided by chemical and materials intuition or systematic searches using well-defined strategies may prove to be fruitful. It is interesting to note that while empirical searches in the oxides gave rise to many superconducting systems, similar (probable?) searches after the discovery of

superconductivity in  $\text{MgB}_2$  have not uncovered any new superconductors."

Paragraph 5 of Dr. News new affidavit states:

As stated in paragraph 5 of my Prior Affidavit the Examiner at pages 4 -5 of the Office Action cites pages 5- 6 of Schuller et al which state:

"The theory of high temperature superconductivity has proven to be elusive to date. This is probably as much caused by the fact that in these complex materials it is very hard to establish uniquely even the experimental phenomenology, as well as by the evolution of many competing models, which seem to address only particular aspects of the problem. The Indian story of the blind men trying to characterize the main properties of an elephant by touching various parts of its body seems to be particularly relevant. It is not even clear whether there is a single theory of superconductivity or whether various mechanisms are possible. Thus it is impossible to summarize, or even give a complete general overview of all theories of superconductivity and because of this, this report will be very limited in its theoretical scope."

Paragraph 6 of Dr. News new affidavit states:

As stated in paragraph 6 of my Prior Affidavit the Examiner at page 5 of the Office Action cites page 7 of Schuller et al which states:

"Thus far, the existence of, a totally new superconductor has proven impossible to predict from first principles. Therefore their discovery has been based largely on empirical approaches, intuition, and, even serendipity. This unpredictability is at the root of the excitement that the condensed matter community displays at the discovery of a new material that is superconducting at high temperature."

Paragraph 7 of Dr. News new affidavit states:

My Prior Affidavit was submitted to clarify what is meant by predictability in theoretical solid state science and to comment on the passages quoted above in paragraphs 4, 5 and 6.

Paragraph 8 of Dr. News new affidavit states:

I am submitting this affidavit to comment on certain remarks made in the Decision on Appeal of the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office (Board's Decision) dated 09/17/2009."

Paragraph 9 of Dr. News new affidavit states:

Apparently motivated by my Prior Affidavit and the arguments made by the patent applicants base on my Prior Affidavit the Board's Decision makes the following comments at page 10 in regards to a paragraph from page 7 of the Schuller article (quoted above in paragraph 6):

As support for the finding of unpredictability in the high temperature superconductor art, the Examiner relies on the Schuller article "A Snapshot View of High-Temperature Superconductivity 2002", which discloses:

Thus far, the existence of a totally new superconductor has proven impossible to predict from first principles. Therefore, their discovery has been based on largely on empirical approaches, intuition, and even serendipity. This unpredictability is at the root of the excitement that the condensed matter community displays at the discovery of a new material that is superconducting at high temperature. (Schuller 7).

Paragraph 10 of Dr. News new affidavit states:

"Boards' Decision page 26, lines 15-19, states

Appellants urge that their predictability position is supported by Schuller's reference to new superconductor discoveries as based largely on empirical approaches, intuition, and serendipity since these bases are typically used by scientists during the discovery process as evidenced by the News affidavit (*id.*). However, Appellants have not established their proposition that predictability is indicated by the use of empirical approaches, intuition, and serendipity in the research and discovery methodology of scientists.

Paragraph 11 of Dr. News new affidavit states:

The first few sentences of paragraph 7 of my Prior Affidavit states:

I am submitting this declaration to clarify what is meant by predictability in theoretical solid state science. A theory of a solid is based on approximate mathematical formalisms to represent these interactions. A theoretical solid state scientist makes an assessment using physical intuition, mathematical estimation and experimental results as a guide to focus on features of the complex set of interactions that this assessment suggests are dominate [sic., dominant] in their effect on the physical phenomena for which the theorist is attempting to develop a theory. This process results in what is often referred to as mathematical formalism. This formalism is then applied to specific examples to determine whether the formalism produces computed results that agree with measured experimental results. This process can be considered a "theoretical experiment."

Paragraph 12 of Dr. News new affidavit states:

"The last few sentences of paragraph 9 of my Prior Affidavit state referring as an example to a well understood theory in semiconductors :

Moreover, that a theoretical computation is a "theoretical experiment" in the conceptual sense [is] not different than a physical

experiment. The theorist starting out on a computation, just as an experimentalist staring out on an experiment, has an intuitive feeling that, but does not know whether, the material studied will in fact be a semiconductor. As stated above solid state scientists, both theoretical and experimental, are initially guided by physical intuition based on prior experimental and theoretical work. Experiment and theory complement each other, at times one is ahead of the other in an understanding of a problem, but which one is ahead changes over time as an understanding of the physical phenomena develops.

These comments equally apply to high  $T_c$  superconductivity.

Paragraph 13 of Dr. News new affidavit states:

It is my position that the Board's Decision as quoted in paragraphs 9 and 10 above is inconsistent with what I stated in my Prior Affidavit as indicated by the representative examples from my Prior Affidavit quoted in paragraphs 11 and 12 above. I refer the complete text of my Prior Affidavit for all the details.

Paragraph 14 of Dr. News new affidavit states:

I disagree with the Board's Decision quoted in paragraph 10 above where it states "Appellants have not established their proposition that predictability is indicated by the use of empirical approaches, intuition, and serendipity in the research and discovery methodology of scientists."

Paragraph 15 of Dr. News new affidavit states

"Physical intuition" to an experimental scientist is developed from the experimental techniques and apparatus they use and the data that they measure. This is their "empirical approaches."

Paragraph 16 of Dr. News new affidavit states

"Physical intuition" to a theoretical scientist is developed from the mathematical and calculation techniques they use (which includes numerical calculations on computers), the equations they develop and the data that they calculate. This is their empirical approaches. Where I use empirical here as I use the term "theoretical experiment" in my Prior Affidavit.

Paragraph 17 of Dr, News new affidavit states:

Both experimental and theoretical scientists are primarily guided by this developed "physical intuition."

Paragraph 18 of Dr, News new affidavit states:

A theoretical scientist does not make random calculations and an experimental scientist does not make random experiments. Such a random approach would not result in useful results.

Paragraph 19 of Dr, News new affidavit states

When a theoretical scientist chooses to go into a particular theoretical direction or when an experimental scientist chooses to go in a particular experimental direction, that direction is guided by "physical intuition" with a reasonable expectation of success in carrying out the experiment or calculation and arriving at a measured or calculated result

Paragraph 20 of Dr, News new affidavit states:

Both theoretical and experimental scientists are primarily guided by "physical intuition" which is developed by educational training and the theoretical work or experimental work that they do.

Paragraph 21 of Dr, News new affidavit states :



When a theoretical or experimental result is achieved, that result is systematically explored to develop a fuller theoretical or experimental understanding which further develops or enhances the scientist "physical intuition."

Paragraph 22 of Dr. News new affidavit states:

Systematic exploration to a theoretical scientist may for example include varying certain parameters used in a calculation, modifying approximate equations used in the calculation or modifying a numerical computational approach. All of this is done with a reasonable expectation of getting successfully calculated results.

Paragraph 23 of Dr. News new affidavit states:

Systematic exploration to an experimental scientist may for example include varying certain experimental conditions, e.g. temperature, time, pressure, mix of constituents, etc. used in an experiment in fabricating samples, modifying measurement apparatus to better measure the physical parameters, and measuring more and different physical parameters to get a fuller set of measured data. All of this done with a reasonable expectation of getting successfully fabricated samples and measured results.

Paragraph 24 of Dr. News new affidavit states

I turn now to Schuller's use of the term "serendipity."

Paragraph 25 of Dr. News new affidavit states:

Both experimental and theoretical scientist uses the term "serendipity." But, an experimental or theoretical observation that they make which they refer to as "serendipitous" was not a

random calculation, a random fabrication of a sample or a random measurement of a sample. Both the theoretical scientist and the experimental scientist set out based on physical intuition, as I have described it above based on "physical intuition" with a reasonable expectation of success that they would successfully make a sample, measure a sample, or perform a calculation. No reasonable scientist of ordinary scientific skill in their scientific discipline would set out on an experiment, measurement or calculation without a reasonable expectation of success. A reasonable scientist of ordinary scientific skill in a scientific discipline does not perform random and arbitrary experiments, calculations and measurements.

Paragraph 26 of Dr. News new affidavit states:

The term "serendipity" to a reasonable scientist of ordinary scientific skill in a scientific discipline means that they recognize that based on their "physical " intuition" they have chosen the correct direction out of a possibility of many directions that may not have yielded as successful a result.

Paragraph 27 of Dr. News new affidavit states

I understand Schuller's use of the term "serendipity or serendipitous" in this context.

Paragraph 28 of Dr. News new affidavit states:

Thus when Schuller in the section for the Schuller article quoted in paragraph 4 above refers to "the serendipitous discovery of superconductivity in  $\text{MgB}_2$ ," he is using the term "serendipitous" in this context and with this meaning,

Paragraph 29 of Dr. News new affidavit states:

I note that Schuller is not an author on the paper first reporting superconductivity in  $\text{MgB}_2$ . The Schuller article at page 7, first paragraph, refers to reference 8 for the "discovery in 2001[8] of  $\text{MgB}_2$ " being a superconductor. See reference 8 at page 39 of the Schuller article. Schuller is not listed as an author.

Paragraph 30 of Dr. News new affidavit states:

The Schuller articles characterization of the discovery of superconductivity in  $\text{MgB}_2$  as "serendipitous" is Schuller's statement and not that of the discoverers, i.e. the authors of the article.

Paragraph 31 of Dr. News new affidavit states

The authors of the article reporting superconductivity in  $\text{MgB}_2$  may consider it a result of their intuition and systematic study based on the work of the inventors, Bednorz and Mueller, of the above identified patent application.

Paragraph 32 of Dr. News new affidavit states:

As I stated in paragraph 19 of my Prior Affidavit "Schuller refers the discovery of  $\text{MgB}_2$  citing the paper of Nagamatsu et al. Nature Vol. 410, March 2001 in which the  $\text{MgB}_2$  is reported to have a  $T_c$  of 39 K, a layered graphite crystal structure and made from powders using known ceramic processing methods.  $\text{MgB}_2$  has a substantially simpler structure than the first samples reported on by Bednorz and Muller."

Paragraph 33 of Dr. News new affidavit states:

I also note that that  $\text{MgB}_2$  was made at least as early as 1954, more than 30 years prior to Bednorz and Mueller's discovery of High  $T_c$  superconductivity, as reported in the following article:

**The Preparation and Structure of Magnesium  
Boride, MgB<sub>2</sub>**

Morton E. Jones and Richard E. Marsh

J. Am. Chem. Soc.; **1954**; 76(5) pp 1434 - 1436;

Paragraph 34 of Dr. News new affidavit states:

I also note that MgB<sub>2</sub> is layered, which is one of the properties that the Bednorz and Mueller patent application says is a property of the materials that they discovered to be high T<sub>c</sub> superconductors.

Paragraph 35 of Dr. News new affidavit states:

I also note that Mg and B are elements that are constituents of materials known to be superconductors prior to the discovery of Bednorz and Mueller.

Paragraph 36 of Dr. News new affidavit states:

Thus to the authors of the article reporting superconductivity in MgB<sub>2</sub> it may not have been "serendipitous" that a previously made material, that is layered and made of elements known to have been constituents of known superconductors, were high T<sub>c</sub> superconductors, but that their result was consistent with their intuition.

Paragraph 37 of Dr. News new affidavit states:

I will not repeat here everything that I said in my Prior Affidavit, but refer to it for the details.

Paragraph 38 of Dr. News new affidavit states:

In closing I note that the concept of a "theory" as used in solid state science or other sciences in the broadest sense refers to the "physical intuition" that a scientist has about a physical phenomenon based on which the scientist forms a "phenomenological understanding" which may not be amenable to

being put into an easily used form for straightforward calculation. This "phenomenological" understanding is part of the "physical intuition" that guides both the experimental and theoretical scientist to pursue a particular direction in their research. This is to be contrasted with the more specialized meaning of the term "theory" which I will refer to as a "formal theory" which means formal analytical expressions in mathematical form based on first principles as I described in my Prior Affidavit. Experimental scientists generally do not develop or work on "formal theories" since this requires extensive training in the mathematical formalisms. Theoretical scientists generally do not perform physical experimentation since this requires extensive training in the experimental techniques. As stated above both experimental and theoretical scientists use "physical intuition" and develop and use their own form of "phenomenological theory" which is their physical understanding of a phenomenon which guides them and others working in the field in further research and development. The inventors, Bednorz and Mueller, described their physical understanding of their discovery in their publications and patent application and others used it in looking for other high  $T_c$  superconductors.

## **22. Section**

Dr. News' second affidavit (attachment BN) (News New Affidavit) addressed the Board's comments at BD page 27. News New Affidavit establishes Appellants' proposition that predictability is indicated by the use of empirical approaches and intuition in the research and discovery methodology of scientists. Moreover, News New Affidavit clarifies what the Schuller article means by "discovery ... based on serendipity" in the research and discovery methodology of scientist

### 23. Section

The Board's Decision states following the statement addressed in the preceding section ( "Appellants have not established their proposition that predictability is indicated by the use of empirical approaches, intuition, and serendipity in the research and discovery methodology of scientists") in the sentence bridging pages 27 and 28 states

Contrary to this proposition, we regard predictability in the context of enablement as involving a reasonable expectation of success. See Wright, 999 F.2d at 1564 ("Wright has failed to establish by evidence or arguments that... a skilled scientist would have believed reasonably that Wright's success with a particular strain of an avian RNA virus could be extrapolated with a reasonable expectation of success to other avian RNA viruses").

As stated in Appellants' Brief and Appellant's Replies, above in this paper and in the Newns Second Affidavit there is a reasonable expectation of success in making and testing species that come within the scope of Appellants' claim for which the Board's Decision has not reversed the Examiner's rejection. This is unrebutted. Also as stated above numerous legal authority states that all species that come within the scope of a claim do not have to be foreseen or known in advance to satisfy enablement. Appellants have shown that Appellants a skilled scientist would have believed reasonably that "[Appellants'] success with ... particular [high materials in identifying them as having the high  $T_c$  property] could be extrapolated with a reasonable expectation of success to other [materials]." Thus Appellants have satisfied this statement from *In re Wright*. Thus the Board's Decision stating to the contrary is legal error.

### 24. Section

The Board's Decision states at BD page 28, line 3 -12:

With respect to the Examiner's reliance on the "Exploring Superconductivity" article as evidencing predictability, Appellants attempt to undermine this evidence via the Bednorz affidavit of record (App. Br., vol. 5, Evidence

Appendix, Attachment AQ) which addresses the Bednorz quotation in this article (App. Br., vol. 1, p. 209). Significantly, the Bednorz affidavit fails to address the article disclosure which states that "there is no accepted theory to explain the high-temperature [superconductivity] behavior of this type of compound" ("Exploring Superconductivity", last para.). The absence of such a theory supports the Examiner's unpredictability position.

As noted above in Section 20 the Total Final Rejection and the Examiner's Answer made no comment on the Bednorz Declaration (Attachment AQ).

Thus for the first time in the prosecution of the present application there is a comment and criticism of the Bednorz Declaration (Attachment AQ). Appellants should not be required to respond in a Request for Rehearing to comments on, criticisms of and notations of deficiencies that have been made for the first time in the Decisions on Appeal. These comments should have been made by the Examiner in prosecution and to the extent that they are being made in the Decision on Appeal, the Board is acting as an examiner and not in its appellate capacity. In view thereof Appellants request that their Request to Reopen Prosecution be granted. Because the Board has introduced arguments, comments on, criticisms of and notations of deficiencies in the Bednorz Declaration (Attachment AQ) Appellants are compelled to introduce rebuttal comments. Attached to this rehearing is a rebuttal declaration of Dr. Bednorz. It will be designated ATTACHEMENT BO.

The last sentence from the Board's Decision quoted above states "[t]he absence of such a theory supports the Examiner's unpredictability position." This conclusion is an error of law. As stated above in *In re Wands* 858 F.2d 731, 742 (Fed. Cir. 1988); 8 U.S.P.Q.2D 1400, 1408 Judge Newman concurring in part, dissenting in part stated "[The inventor] must provide sufficient data or authority to show that his results are reasonably predictable within the scope of the claimed generic invention, based on experiment and/or scientific theory." Thus experiment or theory is sufficient to establish

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predictability. As stated above It is undisputed that the materials that come within the scope of Appellants' claims are not difficult to synthesize and little familiarity with the chemistry going on is required. Species within the scope of Appellants' claims are readily determinable. Appellants take this to mean predictable and to be consistent with Judge Newman's statement. Also as stated above numerous legal authority states that all species that come within the scope of a claim do not have to be foreseen or known in advance to satisfy enablement.

## **25. Section**

### **New Declaration of Bednorz (Attachment BO)**

Paragraph 3 of the Bednorz Second Declaration states:

I previously submitted a declaration dated February 2, 2006.  
(Prior Declaration)

Paragraph 4 of the Bednorz Second Declaration states:

In my Prior Declaration I responded to the USPTO response dated October 20, 2005 at page 7 which cites the following webpage

<http://www.nobelchannel.com/learningstudio/introduction.sps?id=295&eid==0>

Which states

It is worth noting that there is no accepted theory to explain the high-temperature behavior of this type of compound. The BCS theory, which has proven to be a useful tool in understanding lower-temperature materials, does not adequately explain how the Cooper pairs in the new compounds hold together at such high temperatures. When Bednorz was asked how high-temperature superconductivity works, he replied, "If I could tell you, many of the theorists working on the problem would be very surprised."



Paragraph 5 of the Bednorz Second Declaration states:

I am submitting this affidavit to comment on certain remarks made in the Decision on Appeal of the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office (Board's Decision) dated 09/17/2009.

Paragraph 6 of the Bednorz Second Declaration states:

The Board's Decision states at page 27, lines 3-10, in regards to my Prior Affidavit:

With respect to the Examiner's reliance on the "Exploring Superconductivity" article as evidencing predictability, Appellants attempt to undermine this evidence via the Bednorz affidavit of record (App. Br., vol. 5, Evidence Appendix, Attachment AQ) which addresses the Bednorz quotation in this article (App. Br., vol. 1, p. 209). Significantly, the Bednorz affidavit fails to address the article disclosure which states that "there is no accepted theory to explain the high-temperature [superconductivity] behavior of this type of compound" ("Exploring Superconductivity", last para.). The absence of such a theory supports the Examiner's unpredictability position.

Paragraph 7 of the Bednorz Second Declaration states:

I respectfully disagree that I have attempted to "undermine" what I was reported to have said in the Exploring Superconductivity Article.

Paragraph 8 of the Bednorz Second Declaration states:

In the last paragraph of my Prior Declaration I declared that what I stated therein was a true statement. I reaffirm that here.

Paragraph 9 of the Bednorz Second Declaration states:

In my Prior Declaration I explain the meaning of the statement attributed to me "If I could tell you, many of the theorists working on the problem would be very surprised" in response to a question from the interviewer about the mechanism of High  $T_c$  superconductivity.

Paragraph 10 of the Bednorz Second Declaration states:

It appears from the comment in the Board's Decision quoted in paragraph 6 above that it is not clear what the distinction is between an experimental scientist and a theoretical scientist is and how they think about the research work that they do.

Paragraph 11 of the Bednorz Second Declaration states:

The statement attributed to me in the Exploring Superconductivity Article was to my recollection made between October 1987 and December 10 1987. I know it was before December 10, 1987 since that is when the Nobel Prize Award ceremony took place. This was shortly after my co-inventor, Alex Mueller, and I revealed our discovery.

Paragraph 12 of the Bednorz Second Declaration states:

Since, as stated in my Prior Declaration, I am an experimental scientist, I would not have stopped my experimental work to work on developing a formal mathematical theory. To do so would have been a professional mistake. It would have required a substantial amount of in mathematical techniques that existing theoretical scientist were expert in. Moreover, by continuing my experimental work I was able to make further contributions to my experimental work.

Paragraph 13 of the Bednorz Second Declaration states:

I disagree with the Board's Decision quoted in paragraph 6 above where it states "[s]ignificantly, the Bednorz affidavit fails to address the article disclosure which states that 'there is no

accepted theory to explain the high-temperature [superconductivity] behavior of this type of compound' ('Exploring Superconductivity', last para.). The absence of such a theory supports the Examiner's unpredictability position."

Paragraph 14 of the Bednorz Second Declaration states:

It is my position that the statement in the Exploring Superconductivity Article ""there is no accepted theory to explain the high-temperature [superconductivity] behavior of this type of compound"" as quoted in the Board's Decision is referring to a "formal mathematical theory."

Paragraph 15 of the Bednorz Second Declaration states:

I expressed my physical understanding of the phenomenon that I observed in my initial papers and in my patent application.

Paragraph 16 of the Bednorz Second Declaration states:

Both experimental and theoretical scientist work by using "physical intuition".

Paragraph 16 of the Bednorz Second Declaration states:

"Physical intuition" to an experimental scientist is developed from the experimental techniques and apparatus they use and the data that they measure. This is their "empirical approaches."

Paragraph 18 of the Bednorz Second Declaration states:

"Physical intuition" to a theoretical scientist is developed from the mathematical and calculation techniques they use (which includes numerical calculations on computers), the equations they develop and the data that they calculate. This is their empirical approaches. .

Paragraph 19 of the Bednorz Second Declaration states:

Both experimental and theoretical scientists are primarily guided by this developed "physical intuition."

Paragraph 20 of the Bednorz Second Declaration states:

A theoretical scientist does not make random calculations and an experimental scientist does not make random experiments. Such a random approach would not result in useful results.

Paragraph 21 of the Bednorz Second Declaration states:

When a theoretical scientist chooses to go into a particular theoretical direction or when an experimental scientist chooses to go in a particular experimental direction, that direction is guided by "physical intuition" with a reasonable expectation of success in carrying out the experiment or calculation and arriving at a measured or calculated result

Paragraph 22 of the Bednorz Second Declaration states:

Both theoretical and experimental scientists are primarily guided by "physical intuition" which is developed by educational training and the theoretical work or experimental work that they do.

Paragraph 23 of the Bednorz Second Declaration states:

When a theoretical or experimental result is achieved, that result is systematically explored to develop a fuller theoretical or experimental understanding which further develops or enhances the scientist "physical intuition."

Paragraph 24 of the Bednorz Second Declaration states:

Systematic exploration to a theoretical scientist may for example, include varying certain parameters used in a calculation, modifying approximate equations used in the calculation or modifying a numerical computational approach. All of this is done with a reasonable expectation of getting successfully calculated results.

Paragraph 25 of the Bednorz Second Declaration states:

Systematic exploration to an experimental scientist may for example include varying certain experimental conditions, e.g. temperature, time, pressure, mix of constituents, etc. used in an experiment in fabricating samples, modifying measurement apparatus to better measure the physical parameters, and measuring more and different physical parameters to get a fuller set of measured data. All of this done with a reasonable expectation of getting successfully fabricated samples and measured results.

Paragraph 26 of the Bednorz Second Declaration states:

In closing I note that the concept of a "theory" as used in solid state science or other sciences in the broadest sense refers to the "physical intuition" that scientist has about a physical phenomenon based on which the scientist forms a "phenomenological understanding" which may not be amenable to being put into an easily used form for straightforward calculation. This "phenomenological" understanding is part of the "physical intuition" that guides both the experimental and theoretical scientist to pursue a particular direction in their research. This is to be contrasted with the more specialized meaning of the term "theory" which I will refer to as a "formal theory" which means formal analytical expressions in mathematical form based on first

principles. Experimental scientists generally do not develop or work on "formal theories" since this requires extensive training in the mathematical formalisms. Theoretical scientists generally do not perform physical experimentation since this requires extensive training in the experimental techniques. As stated above both experimental and theoretical scientists use "physical intuition" and develop and use their own form of "phenomenological theory" which is their physical understanding of a phenomenon which guides them and others working in the field in further research and development. My co-inventor, Alex Mueller, and I described our physical understanding of our discovery in our publications and patent application and others used it as a guide in looking for other high  $T_C$  superconductors.

## **26. Section**

The Board's Decision states at BD page 28, line 13 -23: states:

In summary, the Schuller article and the "Exploring Superconductivity" article support the Examiner's position that the high temperature superconductor art is unpredictable. This position also is supported by the above-noted disclosure in Appellants' Specification of compounds or compositions which fall within the compound and composition formulae of the appealed claims but which nevertheless fail to exhibit high temperature superconductivity. On the other hand, Appellants' arguments and evidence in support of their opposing view are deficient for the reasons detailed earlier. Based on the record before us, therefore, we agree with the Examiner that the art of high temperature superconductivity is unpredictable.

For the reasons given in Appellants' Brief, Appellants' Replies and in the Newns Second Affidavit, the Bednorz Second Declaration the Schuller article and the "Exploring Superconductivity" article when properly viewed from the point of view of a person of ordinary skill in that art do not support the Examiner's position that the high temperature superconductor art is unpredictable (in the patent law meaning) but

support Appellants' position that the high temperature superconductor art is determinable . Thus the position of the Board's Decision "that the high temperature superconductor art is unpredictable" is an error law and an error of fact..

In addition the above quoted passage from the Board's Decision states "[t]his position also is supported by the above-noted disclosure in Appellants' Specification of compounds or compositions which fall within the compound and composition formulae of the appealed claims but which nevertheless fail to exhibit high temperature superconductivity." As noted above this statement is based on an error of fact. As stated above in the last paragraph of Section 5 the sections of the Examiner's Answer referred to by the Board's Decision in the paragraph BD page1, lines 8-12 quoted in Section 5 BD page1, lines 8-12 above refers to at most two materials that are not superconductors, one of which is a previously know material that is metallic. Thus the Examiner's Answer does not show that Appellant's Specification discloses "numerous compounds or compositions which fall within the compositional definitions of the rejected claims" as stated by the Board's Decision quoted above. Appellant's do not believe two is numerous.

In addition the above quoted passage from the Board's Decision states "Appellants' arguments and evidence in support of their opposing view are deficient for the reasons detailed earlier. Based on the record before us, therefore, we agree with the Examiner that the art of high temperature superconductivity is unpredictable." For the reasons given above Appellants disagree that their evidence is deficient. For the reasons given above the statement "the art of high temperature superconductivity is unpredictable" is an error of fact and law.

## **27. Section**

The paragraph bridging pages 28 and 29 of the Board's Decision states:

This unpredictability supports a prima facie case of non-enablement. The scope of the claims in this subsection also supports prima facie non-enablement. While Appellants' Specification provides reasonable guidance for the mixed transition metal oxides discussed previously, there is insufficient if any guidance in the Specification for the other materials embraced by the claims under review as correctly indicated by the Examiner (see Ans. 23-24). For example, the Specification provides 23 pages of disclosure concerning these mixed transition metal oxides and their constituent elements (i.e., transition metals, rare earth and rare earth-like elements, and alkaline earths) but does not provide any disclosure at all of making high temperature superconductors from any other specifically identified elements. See *Genentech*, 108 F.3d at 1366 ("[W]hen there is no disclosure of any specific starting material or any of the conditions under which a process can be carried out, undue experimentation is required"). Under these circumstances, we are unconvinced by Appellants' argument that the Examiner has failed to establish a prima facie case of non-enablement for the claims discussed in this subsection.

As stated above it is Appellants position that the Board's conclusion on unpredictability is an error of law and an error of fact. Thus it is Appellants position that the conclusion in the passage quoted above that "[t]his unpredictability supports a prima facie case of non-enablement." Is an error of law. Thus it is also Appellants position that the conclusion in the passage quoted above that "[t]he scope of the claims in this subsection also supports prima facie non-enablement" is an error of law. As stated throughout the prosecution of this application (including in BV and RB) and in this paper there is no evidence that anything more is needed to make an test species that come within the scope of Appellants' claims for which the Boards' Decision has not reversed the Examiner's rejections. This is unrebutted. It is also unrebutted that the legal authority cited by Appellants hold that all species that come within the scope of Appellants claims do not have to be know in advance.



It is Appellants position that the following statement from the passage quoted above "[w]hile Appellants' Specification provides reasonable guidance for the mixed transition metal oxides discussed previously, there is insufficient if any guidance in the Specification for the other materials embraced by the claims under review as correctly indicated by the Examiner (see Ans. 23-24)." Appellants disagree. Initially the only statement from the Examiner's Answer at 23-24 relevant to this comment is "[w]hat is not a 'matter of routine experimentation' in this complex, unpredictable art is arriving at superconductive compositions outside the scope of the allowable claims." There is no evidence in the record that workers in the field made many unsuccessful attempts at making species within the scope of the claims for which the board's Decision has not reversed the Examiner's rejections. It is undisputed that the materials that come within the scope of Appellants' claims are not difficult to synthesize and little familiarity with the chemistry going on is required. Thus the Examiner's statement from the Examiner's Answer is not supported by any facts and the Board's reliance on it in the Board's Decision is an error of law. There is not evidence in the record that a person of ordinary skill in the art has to engage in undue experimentation to make and test species for the high temperature superconductor property within the scope of the claim for which the Board Decision has not reversed the Examiner. Every one of these claims includes within their scope species made and tested by Appellants and reported on in their Specification. The Category II materials that the Board's Decision has stated are enabled includes species that come within the scope of these claims. *In re Wands* supports Appellants position. *In re Wands* states "[e]nablement is not precluded by the necessity for some experimentation such as routine screening" *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988). All that is involved in finding species not explicitly described in Appellants' specification is making them by routine methods and testing them by

routine method – this is routine screening that *In re Wands* states is sufficient to support enablement. *In re Wands* further states

The determination of what constitutes undue experimentation in a given case requires the application of a standard of reasonableness, having due regard for the nature of the invention and the state of the art. *Ansul Co. v. Uniroyal, Inc.* [448 F.2d 872, 878-79; 169 USPQ 759, 762-63 (2d Cir. 1971), cert. denied, 404 U.S. 1018, 30 L. Ed. 2d 666, 92 S. Ct. 680 (1972)]. The test is not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed

*In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988)

This quote from *In re Wands* includes the following quotation from *In re Angstadt* the statement “[t]he test is not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed.” (Emphasis added.) It is undisputed in the present appeal that the experimentation to determine other species of high  $T_c$  materials within the scope of the claims is what was known prior to Appellants’ earliest filing date which is thus routine. Thus following *In re Wands* a considerable amount of this type of experimentation is permissible. Appellants note that the passage quoted above from *In re Wands* states that a “considerable amount” of “routine” experimentation or “reasonable guidance with respect to the direction in which the experimentation should proceed” is needed to satisfy enablement **but not both** routine experimentation and reasonable guidance is needed.

The paragraph quoted above from the Board’s Decision states “Appellants’ Specification provides reasonable guidance for the mixed transition metal oxides discussed previously, there is insufficient if any guidance in the Specification for the other materials embraced by the claims

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under review .... For example, the Specification provides 23 pages of disclosure concerning these mixed transition metal oxides and their constituent elements." As stated above these 23 pages contain species within the scope of the claims for which the Board's Decision had not reversed the Examiner's rejections. As *In re Wands* states guidance of the type the Board's Decision appears to state is necessary is in fact not necessary since the experimentation required is only routine. The statement of the Board's Decision that it is necessary is an error of law. It is also in conflict with the many decisions (legal authority) cited in Appellants' Brief and Appellants' Replies that all species do not have to be known in advance and is thus an error of law.

The paragraph quoted above from the Board's Decision states in regard to the 23 pages of "disclosure concerning these mixed transition metal oxides and their constituent elements (i.e., transition metals, rare earth and rare earth-like elements, and alkaline earths) but does not provide any disclosure at all of making high temperature superconductors from any other specifically identified elements. See *Genentech*, 108 F.3d at 1366 ("[W]hen there is no disclosure of any specific starting material or any of the conditions under which a process can be carried out, undue experimentation is required"). " As pointed out above in *Genentech* there was no enabled species at all that came within the scope of the claim being reviewed for enablement. The passage quoted by the Board's Decision from *Genentech* is directed to this situation, that is there is a total failure to enable anything which came within the scope of the *Genentech* claim. That is not the situation here. Every claim from which the Board's Decision did not reverse the Examiner's rejection includes within its scope enabled species (either found enabled by the Examiner or by the Board's Decision.). The Board is applying *Genentech* in a way not intended by this decision. Therefore the manner in which the Board's Decision is applying *Genentech* against Appellants' claims is legal error. What the Board's Decision is if not explicitly, at least implicitly, stating is that even though a

claim, such as claim 12 (or any of the other claims for which the Board's Decision did not reverse the Examiner's rejection) contains what the Board's Decision has found enabled subject matter, subject matter outside of that range, within this claim, is not enabled because "there is no disclosure of any specific starting material or any of the conditions under which a process can be carried out." What the Board's Decision is stating here is that all species that come within the scope of such a claim must be known in advance. How else would one know what the starting material would be except if you know what the species is in advance. This is in conflict with the legal authority cited by Appellant that states such species do not have to be known in advance. Enablement does not require inventors to predict or foresee "every conceivable and possible future embodiment of [their] invention" at the time the application is filed, as stated in *Rexnord Corp. v. Laitram Corp* (Supra). This is only one decision supporting this proposition. Thus the application of *Genetech* in the Board's Decision is legal error. In the passage quoted by the Board's Decision from *Genentech* the conclusion "undue experimentation is required" again applies when there is not species that comes within the scope of the claim that is enabled. What *Genetech* is saying is if there is no species that is enabled that comes within the scope of the claim under review, there is merely a concept disclosed of what is being asserted as a "new, useful and not obvious" invention, but there is not disclosure of how to make and use it as required under 35 USC 112, first paragraph.. This means that undue experimentation is needed to figure out an enabled embodiment which is how to make and use it. In contradistinction when there, other embodiments that are made and used in the same way are enabled if they can be determined without undue experimentation.

Thus the conclusion in the paragraph quoted above from the Board's Decision "[u]nder these circumstances, we are unconvinced by Appellants' argument that the Examiner has failed to establish a prima facie case of non- enablement for the claims discussed in this subsection" is an error of

law. The Board's Decision does not make a prima facie case of lack of enablement since it does not cite any evidence that persons of ordinary skill in the art had or have any difficulty making such species.

## 28. Section

The paragraph bridging pages 29 and 30 of the Board's Decision states:

As rebuttal to a prima facie case of non-enablement, Appellants argue that they "have shown extensive evidence that persons of skill in the art can determine species within the scope of [the claims in this subsection] without undue experimentation" (App. Br., vol. 3, p. 35; *see generally* App. Br., vol. 3, pts. 1-8). These arguments and evidence are unpersuasive for two fundamental reasons. First, they do not carry Appellants' burden of showing enablement with respect to "the full scope of the claimed invention" as defined by the claims under consideration. *Wright*, 999 F.2d at 1561. Second, Appellants' arguments and evidence that these claims are enabled inappropriately rely on the knowledge and skill of the artisan, whereas "[i]t is the Specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement". *Genentech*, 108 F.3d at 1366. The following discussion is a more detailed exposition of the deficiencies of Appellants' arguments and evidence.

Appellants disagree with the statement that they have not carried their "burden of showing enablement with respect to 'the full scope of the claimed invention' as defined by the claims under consideration." Initially Appellants do not agree that the burden has shifted to them

BV1 page 102, lines 7-15 state

In re Angstadt further states at 190 USPQ 219:

We note that the PTO has the burden of giving reasons, supported by the record as a whole, why the specification is not enabling. In re Armbruster, 512 F.2d 676, 185 USPQ 152 (CCPA 1975). Showing that the disclosure entails undue experimentation is part of the PTO's initial burden under Armbruster; this court has never held that evidence of the

necessity for *any* experimentation, however slight, is sufficient to require the applicant to prove that the type and amount of experimentation needed is not undue.

Appellants do not believe that the burden has shifted to them since the Board's Decision has not shown that persons of ordinary skill in the art cannot make species that come within the full scope of the claim for which the board has not reversed the Examiner's rejections and Appellants are not required to know in advance all species that come within the scope of their claims. Even if the burden has shifted to Appellants, Appellants evidence shows that persons of skill in the art can make and test the species that come within the scope of their claims using only what is disclosed in their specification. Appellants do not have to know at the time of filing their application all species that come within the scope of their claims when they can be determined without undue experimentation as is the case here.

Appellants note that in the passage quoted above the Board's Decision states "Appellants' burden of showing enablement with respect to 'the full scope of the claimed invention' as defined by the claims under consideration. *Wright*, 999 F.2d at 1561." As stated above in *In re Wright* there was a single embodiment and there was evidence that years after the Wright application was filed there was difficulty practicing the invention. There is no such evidence in the present application. The full text containing the language "the full scope of the claimed invention" is

Although not explicitly stated in section 112, HN2 to be enabling, the specification of a patent must teach those skilled in the art how to make and use the full scope of the claimed invention without "undue experimentation." *Vaeck*, 947 F.2d at 495, 20 USPQ2d at 1444; *Wands*, 858 F.2d at 736-37, 8 USPQ2d at 1404; *In re Fisher*, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970) (the first paragraph of section 112 requires that the scope of protection sought in a claim bear a reasonable correlation to the scope of enablement provided by the specification). Nothing more than objective enablement is required, and therefore it is irrelevant whether this teaching is provided through broad terminology or illustrative examples. *In re Marzocchi*, 439 F.2d 220, 223, 169 USPQ 367, 369 (CCPA 1971).

In re Wright, 999 F.2d 1557, 1561 (Fed. Cir. 1993)

As stated many times species can be made and tested by known methods . Thus only routine screening is involved and thus there is not undue experimentation involved. to practice the full scope of the claimed invention. Appellants have used objective enablement based on "broad terminology or illustrative examples." "[n]othing more... is required"

Appellants disagree with this statement from the passage quoted above that

Appellants' arguments and evidence that these claims are enabled inappropriately rely on the knowledge and skill of the artisan, whereas "[i]t is the Specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement".  
*Genentech*, 108 F.3d at 1366.

Appellants disagree that they rely for enablement on "the knowledge and skill of the artisan." Appellants' Specification teach method of making and testing species. It is un rebutted that those methods can be used to make a test species that come within the scope of the claims for which the Board's Decision had not reverse the Examiner's rejection and wherein the superconducting element falls outside of the Category II Materials. Thus Appellants' are relying on the knowledge of the skill if the art as suggested by the Board's Decision. The Board's Decision relies on this stement from *Genetech* "[i]t is the Specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement". As stated above this applies to the situation where there is no enabled species that comes within the scope of the claim under review. That is, a patent application cannot be directed to a "novel" concept only relying on persons of skill in the art knowing how to implement the "novel" concept of the claimed invention. That is not the case for the claims under appeal in the present application. As stated above every

claim under appeal include within their scope species found enabled by the Examiner or the Board's Decision. For example if a claim has two elements A and B where A is old and B is new of novel, it is necessary for the patent application to describe how to make B, the patent application cannot rely on what is known to a person of skill in the art to make B but can rely on what is know to a person of skill in the art to make B. In the present application some of the superconducting elements will be made of old materials. Only routine (old) testing need to be done to screen for them or to determine if they have the desired superconducting property. Others will have to be made by the (old) known principles and tested by the old routine testing described in Appellants' Specification to determine if they have the high temperature superconducting property. This analysis is supported by *Genentech* which states

a specification need not disclose what is well known in the art. See, e.g., *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1385, 231 U.S.P.Q. (BNA) 81, 94 (Fed. Cir. 1986). However, that general, oft-repeated statement is merely a rule of supplementation, not a substitute for a basic enabling disclosure.

*Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1366 (Fed. Cir. 1997)

The novel aspect of the invention is not the method of making the material, not the method of testing the material and not the materials. The novel aspect is having a  $T_c$  greater than or equal to 26 K. For example, the Schuller article refers to  $MgB_2$  which was made more than 30 years before Appellants' discovery. It just ad to be tested by method know since 1911.

Appellants note that the Board's Decision relies on the statement "[i]t is the Specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement". *Genentech*, 108 F.3d at 1366, but does not identify what the



Board considers to be the novel feature. It is not possible for Appellant to respond without knowing what the Board considers to be the novel feature. Appellants request that the Board grant Appellants' request to reopen prosecution and state what the Board considers the novel aspect to be.

## **29. Section**

The Board Decision at page 30, line 6-13, are directed to the "Examiner's first enablement Statement." BD page 30, lines 6—13 states

The First Statement involves the Examiner's acknowledgement that artisans using known principles of ceramic fabrication would be able to make known superconductive compositions. However, the claims under review are not limited to ceramic compositions (i.e., compositions which can be made using known principles of ceramic fabrication). More importantly, it is Appellants' Specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement. *Genentech*, 108 F.3d at 1366.

As stated above Appellants note the Board's Decision does not identify what the Board considers the novel aspect of Appellants' invention to be. Thus Appellants cannot adequately respond to the board's comments and in view thereof as requested above Appellants request the Prosecution be reopened. The CAFC clarified *Genentech* stating:

Our ruling in *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361 (Fed. Cir. 1997), is not to the contrary. Although extrinsic evidence cannot be used to supplement a non-enabling specification, such evidence can shed light on whether the specification is itself enabling.

*Pharm. Res., Inc. v. Roxane Labs., Inc.*, 253 Fed. Appx. 26, 31 (Fed. Cir. 2007)

Thus extrinsic evidence can be used to show that the specification is enabling. The extensive evidence Appellants have submitted in the prosecution of their application is just for this purpose that is to show that a very large varied on a materials can be made by the methods described in their Specification. This is un rebutted This extensive evidence has not been used to supply missing information necessary to made the "novel" feature.

The passage quoted above from the Board's Decision states "the claims under review are not limited to ceramic compositions (i.e., compositions which can be made using known principles of ceramic fabrication)." Appellants respectfully disagree. The following claims recite that the high Tc element of the claims from which these claims depend "can be made according to known principles of ceramic science" or similar recitation: dependent claims 322 to 360, 414 to 427, 436, 453 to 465, 473 to 475, and 484 to 491 and independent claim 522. Of these claims the following are allowed by the Examiner: 330, 335, 336, 346 and 358. Most of the dependent claims are in multiple dependent form.. The Board's Decisions reversed the Examiner's rejection of parts of the other multiple dependent claims. Others remain with the Examiner's rejections not reversed.

In addition,

- independent claims 59 is directed to "a ceramic like material" and
- independent claim 374 is directed to "a material comprising a ceramic characteristic.".

Dependent claim 351 depends from claim 59 and states that the "ceramic like material" "can be made according to known principles of ceramic science."

Dependent claim 419 depends from claim 374 and states that the "the material comprising a ceramic characteristic" "can be made according to known principles of ceramic science."

Some of these claims are listed below.

Appellants note that at this web address of the Nobel Prize website

[http://nobelprize.org/nobel\\_prizes/physics/laureates/1987/](http://nobelprize.org/nobel_prizes/physics/laureates/1987/)

the following announcement of Appellants award of the 1987 Nobel Prize can be found.



## The Nobel Prize in Physics 1987

"for their important break-through in the discovery of superconductivity in ceramic materials"



J. Georg Bednorz



K. Alexander Müller



## The Nobel Prize in Physics 1987

"for their important break-through in the discovery of superconductivity in ceramic materials"

This states that the 1987 Nobel Prize was awarded to Appellants "for their important break-through in the discovery of superconductivity in ceramic material." The Board's Decision does not find enabled a claim commensurate in scope with the contribution for which they were awarded the Nobel Prize.

CLAIM 59 A combination, comprised of:

**a ceramic-like material** having an onset of superconductivity at an onset temperature greater than or equal to 26°K,

means for passing a superconducting electrical current through said ceramic-like material while said material is maintained at a temperature greater than or equal to 26°K and less than said onset temperature, and

means for cooling said superconducting ceramic-like material to a superconductive state at a temperature greater than or equal to 26°K and less than said onset temperature, said material being superconductive at temperatures below said onset temperature and a ceramic at temperatures above said onset temperature.

CLAIM 351 A **combination according to claim 59, wherein said ceramic-like material can be made according to known principles of ceramic science.**



CLAIM 374 A combination, comprised of:

**a material comprising a ceramic characteristic** comprising an onset of superconductivity at an onset temperature greater than or equal to 26°K,

means for passing a superconducting electrical current through said material comprising a ceramic characteristic while said material is maintained at a temperature greater than or equal to 26°K and less than said onset temperature, and

means for cooling said superconducting material having a ceramic characteristic to a superconductive state at a temperature greater than or equal to 26°K and less than said onset temperature, said material being superconductive at temperatures below said onset temperature and a ceramic at temperatures above said onset temperature.

CLAIM 419 A combination according to claim 374, wherein said material can be made by known principles of ceramic science.



CLAIM 522 An apparatus comprising:

a superconductive current carrying element comprising a  $T_c$  greater than or equal to 26 °K

said superconductive current carrying element comprises a composition that can be made according to known principles of ceramic science.



CLAIM 438 An apparatus comprising: a means for conducting a superconducting current at a temperature greater than or equal to 26°K and a means for providing an electric current to flow in said means for conducting a superconducting current.

CLAIM 453 An apparatus according to anyone of claims 438, 439 or 440, wherein said means for conducting a superconducting current can be made according to known principles of ceramic science.

### 30. Section

The Boards' Denison at page 30, lines 14-23 is directed to the Examiner's Second Enablement Statement. The Boards Decision state at page 30, lines 20-23

Contrary to Appellants' presumption, a reference such as the Asahi Shibum article need not be enabled in order to qualify as prior art for the purpose of determining obviousness under § 103. *Symbol Techs., Inc. v. Opticom, Inc.*, 935 F.2d 1569, 1578 (Fed. Cir. 1991).

Appellants do not disagree with this statement since it is consistent with what Appellants stated. For the Asahi Shibum article to render Appellants' claims obvious even if it is not enabling itself a person of ordinary skill in the art must be able to practice the invention that is considered obvious. The missing information must come from some where else such as other documents or from what is know to a person of skill in the art. The Examiner rejected the claim over the Asahi Shibum Article alone. Thus it was and still is the Examiner's view that nothing more than knowing that a material was discovered having the high  $T_c$  property was sufficient for a persons of skill in the art to practice Appellants' claimed invention to their full scope. The Boards Decision agrees with Appellants. Once the "novel feature" - the high  $T_c$  property – was disclosed every person of skill in the art knew how to make more of them. Thus the Board's Decision agrees with Appellants that how to make and test species was sufficient to find all other high  $T_c$  materials. without providing more information than is contained in Appellants Specification. This is what Appellant said at BV1 page 158, first sentence of the last paragraph "Thus in the Office Action of 7-30-98, the Examiner is effectively stating that everything within Applicants' non-allowed claims rejected under 35 USC 103 over the Asahi Shinbum article alone can be practiced by a person of skill in the art with what is taught in the Asahi Shinbum article in combination with what is known to a person of skill in the art." Something which is obvious cannot be not enabled at the same time. The Board's Decision agrees with this. The

United States Supreme Court agrees with this in *Loom v Higgins*. See BV1 page 238.

### **31. Section**

The Board's Decision in the paragraph bridging pages 30 and 31 is directed to the Examiner's Third Enablement Statement. Appellants disagree with the Board's statement that they see no merit in this argument. The Schuller Article refers to  $MgB_2$  which was made more than 30 years prior to Appellants' discovery. Its high  $T_c$  property is inherent. . There is nothing novel about making it ant testing it. Thus persons or ordinary skill in that art are enabled to make and test it. From the Shuller article it was found to have the high  $T_c$  property motivated by Appellants discovery. It has a layered structure an attribute taught by Appellants' specification. This is similar to the reasons identified under the Examiner's Third Enablement Statement that Appellant was denied claims to the chemical compositions disclosed in their Specification, that is they were enabled by prior art structures identified by the Examiner.

### **32. Section**

The Boards' Decision at page 31, lines 9 to page 32 line 2, is directed to the Fourth Enablement Statement. BD paragraph bridging pages 31 and 32 states in regards to the Examiner's Fourth Enablement Statement:

We do not agree with Appellants that the Examiner's statement constitutes the above-quoted acknowledgement. Further, we do not agree with Appellants that the mere capability to make and test compositions encompassed by the claims under review satisfies the enablement requirement. Rather, enablement requires the Specification to teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation wherein it is the Specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement. *Genentech*, 108 F.3d at 1365-1366.



Appellants disagree with this statement. Appellant respectfully submits it is an error of law. The Examiners Fourth Enablement Statement acknowledges that persons of skill in the art know how to control the materials they fabricate through their acknowledged high level of skill to, as stated in the Schuller Enablement Statement, systematically fabricate and test materials to determine without undue experimentation whether they have the desired high  $T_c$  property. According to the CAFC in *In re Wands* (BV1 pages 125-128), the CCPA in *In re Angstadt* (BV1 pages 76-80), and the United States Supreme Court in *Mineral Separation v. Hyde* (BV1 pages 228-237). Each of which states the routine screening satisfies the enablement requirement. This is the controlling precedent. As stated above the manner in which the Board's Decision is applying *Genentech* is an error of law. As stated above the Board's Decision does not identify what it considers to be the "novel aspect" of Appellants' claims. Appellants therefore cannot properly respond to this comment. Appellants are not relying on knowledge of persons of skill in the art for the novel aspect (as defined above by Appellants) of their invention and as stated above there is no evidence that undue experimentation is needed to practice the full scope of their claims.

### **33. Section**

The Board's Decision at BD page 32, lines 5-11, comments on the Poole 1988 Enablement Statement. (BV3 pages 6-8). The Poole 1988 Enablement statement is independent corroboration of the truth of the teaching of Appellants' Specification. The implication of Board's Decision is that Appellant is relying on Poole 1988 to supply novel aspect of Appellants' claimed invention. This is an error of fact. Since the Board's Decision does not define what it means by this, the Board's Decision is inconclusive. It is Appellants' position that the statement of the Board's Decision "[a] explained earlier, the capability of an artisan to fabricate such materials is by itself inadequate to establish enablement" is for the reasons given above.

an error of law. This statement implicitly requires the all species that come within the scope of a claim must be known in advance for a claim to be enabled. This is an error of law. Appellants have cited numerous decisions (legal authority) that clearly state that all species that come within the scope of a claim do not have to be foreseen to satisfy enablement. It is Appellants' position that the statement of the Board's Decision "this capability relates to the knowledge and skill of an artisan rather than to the requirement that a Specification supply the novel aspects of a claimed invention in order to provide enablement. *Genentech*, 108 F.3d at 1366." Again the Board's Decision does not define what it means as the "novel aspect" of Appellants' claimed invention. Thus this statement is an error of fact, inconclusive, and an error of law.

#### **34. Section**

The Board's Decision at BD page 32, lines 12 to page 33, line 3-11, comments on the Poole 1995 Enablement Statement and the Poole 1996 Enablement Statement Enablement Statement (BV3 pages 6-8) which states:

The Poole 1995 and 1996 enablement statements involve confirmation that high temperature superconductors possess characteristics disclosed in Appellants' Specification such as metallic, perovskite-like, mixed-valence, and layered structure characteristics. While it is true that the Specification associates these characteristics with Appellants' invention of mixed transition metal oxide superconductors, the Specification also associates these same characteristics with prior art superconductors. See the Background Art section of the Specification wherein prior art superconductors are described as metallic (Spec. para, bridging 1-2), perovskite-like (Spec. para, bridging 3-4) which includes a layered structure, and mixed-valence (*id.*). We do not see and Appellants do not explain why enablement is evidenced by the fact that the same characteristics are exhibited by superconductors known in the prior art and the superconductors discovered by Appellants. In any event, we again remind Appellants that it is the Specification, not the knowledge of one skilled in the art, that must

supply the novel aspects of an invention in order to constitute enablement. *Genentech*, 108 F.3d at 1366.

In the paragraph quoted above the Board's Decision states "[w]e do not see and Appellants do not explain why enablement is evidenced by the fact that the same characteristics are exhibited by superconductors known in the prior art and the superconductors discovered by Appellants." Appellants have not provided the referenced explanation since this has never been made an issue in the prosecution of this application. For the first time this is being raised in the Board's Decision. Appellant should not be required to respond to such a question in a Request for Rehearing. Appellants request that the Request to Reopen Prosecution be granted so that new factual inquiries and questions such as these can be properly responded to during prosecution. Enablement is evidenced by the fact that the same, similar or related characteristics are exhibited by superconductors known in the prior art and the superconductors discovered by Appellants because this shows that the behavior of the materials either superconductive or not superconductive are understood and their behavior is thus predictable and determinable. This is what establishes or evidences enablement. This also evinces or established how species are selected to make an test for the desired high  $T_c$  property. The quoted passage above again quotes "[i]n any event, we again remind Appellants that it is the Specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute enablement. *Genentech*, 108 F.3d at 1366. The full citation from *Genetech* is

the omission of minor details does not cause a specification to fail to meet the enablement requirement. However, when there is no disclosure of any specific starting material or of any of the conditions under which a process can be carried out, undue experimentation is required; there is a failure to meet the enablement requirement that cannot be rectified by asserting

that all the disclosure related to the process is within the skill of the art. It is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement. This specification provides only a starting point, a direction for further research.

Genentech, Inc. v. Novo Nordisk A/S, 108 F.3d 1361, 1366 (Fed. Cir. 1997)

The Board's Decision repeatedly quotes the same passage leaving out "when there is no disclosure of any specific starting material or of any of the conditions under which a process can be carried out, undue experimentation is required." *Genetech* does not state that this disclosure in the specification is required for every species that could come within the scope of the claim in order to establish enablement. This is the way the Board's Decision is applying this language. This is legal error. . In *Genetech* there was no species the came within the scope of the claim under review that satisfied this language. As stated above for every claim for which the Board's Decision has not reversed the Examiner's rejection there is disclosure of specific starting material and of the conditions under which a process can be carried out. Thus there is no undue experimentation required."

### **35. Section**

The Board's Decision at BD page 33, lines 4-9, comments on the Schuller Enablement Statement (BV3 pages 8-9) and the Poole 1996 Enablement Statement Enablement Statement which states:

Appellants also rely on the so-called Schuller enablement statement as evidence of enablement (App. Br., vol. 3, p. 8-9). This statement concerns Schuller's above-discussed disclosure that the process of superconductor discovery includes, for example, the use of intuition. We have previously explained why this disclosure does not establish predictability in the high temperature superconductor art. For analogous

reasons, Schuller's disclosure fails to evince enablement for the claims in this subsection.

As stated above Appellants submitted the Affidavit of Newns (Brief Attachment AP) to comment on the Schuller Article. the Examiner made no comments on the Affidavit of Newns (Brief Attachment AP). Specifically the Examiner did not state "Schuller's disclosure fails to evince enablement" for any of the claims. The new reason for rejection is being made for the first time in the Board's Decision. Appellants request that the Board grant Appellants' Request to Reopen prosecution so that Appellants will have the proper opportunity to respond in prosecution and so that they will not be required to respond to this new argument for the first time in a Request for Rehearing. Appellants have submitted herewith the Second Affidavit of Newns to explain "intuition" as described above.

### **36. Section**

The Board's Decision at BD page 33, line 10 to page 34, line 3, comments on Appellants additionally rely on the affidavits of record by Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns, and Bednorz (See App. Br., vol. 5, Evidence Appendix, Attachments AH to AR). BD page 33, line 13 to page 34, line 3, states:

The Newns and Bednorz affidavits do not support Appellants' enablement position for the same previously-given reasons that they do not support Appellants' predictability position. The remaining affidavits share common deficiencies. The Shaw affidavit (App. Br., vol. 5, Evidence Appendix, Attachment AM) is illustrative. In this affidavit, Shaw states that persons of ordinary skill in this art are capable of fabricating ceramic materials exhibiting high temperature superconductivity by using principles of ceramic fabrication known in the prior art (see e.g., paras. 8, 11, 49, 50). Such statements do not evince enablement for reasons explained earlier. That is, all the claims under consideration are not limited to high temperature superconductive ceramic materials. Moreover, it is the Specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to

constitute adequate enablement. *Genentech*, 108 F.3d at 1366. The affidavits relied upon by Appellants do not explain how the Specification supplies novel aspects of Appellants' invention to thereby enable the full scope of the claims under consideration.

As stated above the Examiner during prosecution, in the total Final Action, or the Examiner's Answer made no comment the Affidavits of Tsui, Dinger and Shaw (Brief Attachments AM, AN and AO) or on the Affidavit of Newns (Brief Attachment AP) or on the Declaration of Bednorz (Brief Attachment AQ). The Board's Decision cites . The passage quoted above states: "[t]he Newns and Bednorz affidavits do not support Appellants' enablement position for the same previously-given reasons that they do not support Appellants' predictability position." Appellants disagree for the same reasons given in response to the new reasons given in the Board's predictability position. This comment is made for the first time in the prosecution of this application in the Board's Decision. The Examiner made no comment at all on these affidavits. Appellant request that their Request to Reopen Prosecution be granted so that they can properly respond to these comments in prosecution. Appellants should not be required for the first time to respond to such comments in a Request for Rehearing. The passage quoted above states "[t]he remaining affidavits share common deficiencies. The Shaw affidavit .. is illustrative. In this affidavit, Shaw states that persons of ordinary skill in this art are capable of fabricating ceramic materials exhibiting high temperature superconductivity by using principles of ceramic fabrication known in the prior art ..Such statements do not evince enablement for reasons explained earlier. That is, all the claims under consideration are not limited to high temperature superconductive ceramic materials." This comment is made for the first time in the prosecution of this application in the Board's Decision. The Examiner made no comment at all on these affidavits. Appellants request that their Request to

Reopen Prosecution be granted so that they can properly respond to these comments in prosecution. Appellants should not be required for the first time to respond to such comments in a Request for Rehearing.

Appellants note (see Initial Comments at page 2 at the beginning of this paper) the following claims recite that the high Tc element of the claims from which these claims depend "can be made according to known principles of ceramic science" or similar recitation: dependent claims 322 to 360, 414 to 427, 436, 453 to 465, 473 to 475, and 484 to 491 and independent claim 522. In addition,

- independent claims 59 is directed to "a ceramic like material" and
- independent claim 374 is directed to "a material comprising a ceramic characteristic.".

In the passage quote above the Board's Decision again states "it is the Specification, not the knowledge of one skilled in the art that must supply the novel aspects of an invention in order to constitute adequate enablement. *Genentech*, 108 F.3d at 1366." As noted above the way in which the Board's Decision applies *Genentech*, in particular the specifically cited passage is an error of law.

In the passage quote above the Board's Decision states "[t]he affidavits relied upon by Appellants do not explain how the Specification supplies novel aspects of Appellants' invention to thereby enable the full scope of the claims under consideration." Appellants not the Examiner never raised this issue in prosecution, the Total Final Action or in the Examiner's Answer.

This issue is being raised for the first time in the Board's Decision.

Appellants request that their Request to Reopen Prosecution be granted so that they can properly respond to these comments in prosecution.

Appellants should not be required for the first time to respond to such

comments in a Request for Rehearing. Moreover, the Board's Decision does not define what it means by the "novel aspect." Thus Appellants cannot respond to this comment. Appellants request the Board to grant Appellants Request to Reopen Prosecution and provide a construction of the "novel aspect" so that Appellants can respond to this comment. If the Examiner did not ask for this in prosecution then the Examiner did not make a prima facie showing of lack of enablement. To the extent that is being asserted for the first time and it is required then a prima facie showing is being made for the first time by the Board's Decision. Appellants explained above what they believe is the novel aspect, that is that material have a  $T_c$  greater than or equal to 26 K. Such material can be made and tested according to the teaching of Appellants' Specification to the full scope of the claims. This is not disputed. Thus Appellants' claims are enabled to their full scope.

### **37. Section**

. The Board's Decision at page 34 lines 4-15, states:

In light of the foregoing, the arguments and evidence presented by Appellants in this appeal have little if any value in establishing that, on the original application filing date of 22 May 1987, a skilled scientist in this art would have believed reasonably that Appellants' high temperature superconductivity success with the mixed transition metal oxide materials discussed above could be extrapolated with a reasonable expectation of success to other materials. See *Wright*, 999 F.2d at 1564 ("Wright has failed to establish by evidence or arguments that, in February of 1983, a skilled scientist would have believed reasonably that Wright's success with a particular strain of avian RNA virus could be extrapolated with a reasonable expectation of success to other avian RNA viruses").

Appellants disagree with this conclusion. As stated above in *In re Wright* only one example was disclosed and there was evidence that years after Wright's invention persons of skill in the art were having difficulty making other



species. As stated above there is not such evidence in the present Application. There is no example of a high  $T_c$  superconductor that cannot be made and tested following the teaching of Appellants' Specification to determine if the species has the desired property. It is undisputed that persons of ordinary skill in the art had a reasonable expectation of success of making and testing species. This art is well understood and the many legal authorities cited in Appellants' Brief and Appellant's Replies clearly state the all known species that come within the scope of a claim do not have to be known in advance. Enablement does not require inventors to predict or foresee "every conceivable and possible future embodiment of [their] invention" at the time the application is filed, as stated in *Rexnord Corp. v. Laitram Corp* (Supra) The Board's Decision has not responded to these legal authorities. The Board's Decision continually relies on applying *Genetech* in a manner which is an error of law as stated above.

### **38. Section**

The Board's Decision at BD page 34 lines 10-23, commenting on legal precedent cited by Appellants states:

Appellants rely on numerous legal authorities in support of their enablement viewpoint. For the most part, however, these authorities and Appellants' arguments regarding them are not concerned with the pivotal question of why Appellants' Specification would have led an artisan to reasonably believe that Appellants' success with the previously noted mixed transition metal oxides could be extrapolated with a reasonable expectation of success to the other materials embraced by the claims of this subsection. Nevertheless, it is important that we clarify misimpressions created by Appellants' arguments regarding certain legal authorities.

Appellants respectfully disagree that the legal authorities cited by Appellant and their arguments regarding them "would have led an artisan to reasonably believe that Appellants' success with the previously noted mixed

transition metal oxides could be extrapolated with a reasonable expectation of success to the other materials embraced by the claims of this subsection." Initially the Examiner never raised this issue in prosecution, in the Total Final Action or in the Examiner's Answer. Appellants responded to every argument and reason for rejection raised by the Examiner. The Board for the first time is raising this issue in the Board's Decision. Appellants should not be required to respond to this comment in a Request for Rehearing. Thus Appellants request the their Request to Reopen Prosecution be granted. To the extend that is essential to establish enablement by showing that Appellants' Specification "would have led an artisan to reasonably believe that Appellants' success with the previously noted mixed transition metal oxides could be extrapolated with a reasonable expectation of success to the other materials embraced by the claims of this subsection," the Examiner's failure to raise this issue in prosecution or at the latest in the Final Action, means that the Final Action has not made out a prima facie case of lack of enablement. Thus a prima facie case of lack of enablement which is being made for the first time in the Board's Decision and Appellants' Request to Reopen Prosecution should be granted.

Appellant disagrees that the have created misimpressions regarding certain legal authorities.

### **39. Section**

The Board's Decision at BD page 34 line 24 to page 35, 3 lines from the bottom, are directed to the Board's comments on *In re Fischer*, 427 F.2d 833, 839 (CCPA 1970).

For purposes of clarification of the record Appellants note in the last paragraph at RB page 12 states:

Applicants discovered that ceramic materials are superconductors. Their work lead and leads others to look for other species. Applicants' evidence shows that those others used Applicants teaching to determine those species. Thus

following *In re Fisher* "It is apparent that such an inventor should be allowed to dominate the future patentable inventions of others where those inventions were based in some way on his teachings." (166 USPQ 18, 24) (**The CAFC referred to this statement as dictum** in *Plant Genetic Sys. v. DeKalb Genetics Corp.*, 315 F.3d 1335, 1340 (Fed. Cir. 2003), 65 U.S.P.Q.2D (BNA) 1452.)

Appellants note the full citation is:

PGS notes that Fisher also stated that "such an inventor should be allowed to dominate the future patentable inventions of others where those inventions were based in some way on his teachings." *Fisher*, 427 F.2d at 839. This dictum, however, only sets the context for Fisher's holding that "it is equally apparent, however, that [the inventor] must not be permitted to achieve this dominance by claims which are insufficiently supported and hence not in compliance with the first paragraph of 35 USC 112." *Id.*

*Plant Genetic Sys. v. DeKalb Genetics Corp.*, 315 F.3d 1335, 1340 (Fed. Cir. 2003)

Dictum is not the holding of a decision but it is persuasive authority. Since it is Appellants position that they have fully enabled their claims, thus dictum applies to them.

#### **40. Section**

The Board's Decision from page 35, 3 lines from the bottom to page 41, line 17 applies the 8 factors *In re Wands* 858 F.2d at 737 as relevant to determining whether their Specification disclosure enables the claims under consideration without undue experimentation.

BV1 page 126, lines 11-14, state in regards to the *In re Wands* eight factors:

The Examiner has not applied these factors. And in the final rejection the Examiner has not commented on nor rebutted

Applicants' analysis of the application of the *In re Wands* factors to the present application in Applicants' Response dated 01/28/2005 in response to Office Action dated 07/28/2004. Applicants have shown that:

BV1 page 129, lines 14-19, state in regards to the *In re Wands* eight factors:

A conclusion of lack of enablement means that, based on the evidence regarding each of the above factors, the specification, at the time the application was filed, would not have taught one skilled in the art how to make and/or use the full scope of the claimed invention without undue experimentation. *In re Wright*, 999 F.2d 1557, 1562, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993). It is the Examiner's burden to show this and the Examiner has clearly not done so.

The Examiner's Answer did not address the eight *In re Wands* factors, thus the Total Final Rejection and the Examiner's Answer did not make out a *prima Facie* case of lack of enable of any of the rejected claim, including those for which the Board's Decision did not reverse the Examiner's rejections. For the first time in the prosecution of this application the eight *In re Wands* factors are applied in the Board's Decision. Appellants should not be required in a Request for Rehearing to respond for the first time to an application of the eight *In re Wands* factors. In view thereof Appellants request that their Request to Reopen Prosecution be granted so that they can properly respond to the application of these factors for the first time in prosecution.

At BD page 36, line 11-14, the first *In re Wand* Factor (1) the quantity of experimentation necessary is applied. The Board's decision states :

There is no meaningful limit to the quantity of experimentation required by the claims in this subsection. This is because these claims define the recited high temperature superconductor with a broad scope which includes, for example, any oxide (claim 12) or any composition (claim 88).

Initially claim 12 and claim 88 are not the only claims for which the Board's Decision has not reversed the Examiner rejection. The Board has only identified two of the broadest claims. Each has been appealed separately and should be treated separately. The there is no meaningful limit to the number of species is not fatal to finding of enablement.

*In re Angstadt* 190 USPQ 214, 218 (CCPA 1976) applies essentially the same eight *In re Wands* factors. (See BV1 page 104) BV1 paragraph bridging page 70-71 states

According to *In re Angstadt* 190 USPQ 214, 218 (CCPA 1976) in an unpredictable art, §112 does not require disclosure of a test with every species covered by a claim. The CCPA states:

To require such a complete disclosure would apparently necessitate a patent application or applications with "thousands" of examples or the disclosure of "thousands" of catalysts along with information as to whether each exhibits catalytic behavior resulting in the production of hydroperoxides. More importantly, such a requirement would force an inventor seeking adequate patent protection to carry out a prohibitive number of actual experiments. This would tend to discourage inventors from filing patent applications in an unpredictable area since the patent claims would have to be limited to those embodiments which are expressly disclosed. A potential infringer could readily avoid "literal" infringement of such claims by merely finding another analogous catalyst complex which could be used in "forming hydroperoxides." (Emphasis Added)

Thus according to *In re Angstadt* a claim encompassing thousand of species can be enabled by a small number of examples,

BV1 page 229 6 Lines from the bottom to page 231, line 3 states in regards to the United States Supreme Court decision in *Minerals v. Hyde*:

The claims found enabled are directed to "ores." The Supreme Court did not require the claims of the Minerals Patent to be limited

to the ores that were recited in the patent. The claims include within their scope "ores" described in the patent, ores known by others and not described in the patent, ores not yet discovered and, moreover, would include within their scope an ore type materials that was not naturally occurring, but which could be made by man. The Supreme Court states as quoted above in the Supreme Court Minerals v. Hyde Enablement Statement "The composition of ores varies infinitely." The patent applicant was not required to describe the infinite variation of the ores in the patent to generically claim an ore and for this generic claim to be enabled for all ores. The only specific description in the Minerals Patent of an ore is at Col. 1, lines 10 – 12 which states "This invention relates to improvements in the concentration of ores, the object being to separate metalliferous matter, graphite, and the like from gangue by means of oils, fatty acids, or other substances which have a preferential affinity for metalliferous matter over gangue" and at Col. 2, lines 70 – 76, "The following is an example of the application of this invention to the concentration of a particular ore. An ore containing ferruginous blende, galena, and gangue consisting of quartz, rhodonite, and garnet is finely powdered and mixed with water containing a fraction of one per cent, or up to one per cent, of a mineral acid or acid salt, conveniently sulfuric acid or mine or other waters containing ferric sulfate." The reason given by the Supreme Court, as quoted above in The Supreme Court Minerals v. Hyde Enablement Statement, for why the generic claims covering an infinite number of species were enabled is "[t]he process is one for dealing with a large class of substances and the range of treatment within the terms of the claims, while leaving something to the skill of persons applying the invention, is clearly sufficiently definite to guide those skilled in the art to its successful application, as the evidence abundantly shows. This satisfies the law." That there is a large class (infinite in number) of substances within the scope of the claim that may not be specifically described, and where the specification only describes a small number of preferred embodiments, does not render the claim not enabled. The Supreme Court clearly says "leaving something to the skill of persons applying the invention is clearly sufficiently definite to guide those skilled in the art to its successful application." Moreover, there is no certainty that the claimed method in the Materials Patent would work for every ore until it was experimentally determined to work for a particular ore. This did not render the claims not enabled. It is clear that the Supreme Court did not find that it was necessary to know what ores the process worked for in advance since this was experimentally determinable by techniques known to persons of skill in the art following the teaching in the Minerals Patent. Thus the patent applicant of the Minerals Patent was not required to foresee (or

predict in the sense used by the Examiner of the present application) all species that came within the scope of the Minerals Patent claims. The same is true of the claims under appeal herein and rejected as not enabled.

Thus a claim wherein there is a large class (infinite in number) of substances within the scope of the claim that may not be specifically described, and where the specification only describes a small number of preferred embodiments, does not render the claim not enabled.

BD page 36, line 16-19 states:

According to Appellants, "Applicants have shown that the quantity of experimentation needed to make samples to use the invention based on the content of the disclosure in the specification is routine experimentation" (App. Br., vol. I, p. 128). This statement is inaccurate.

The Board's comment in regards to Appellants comment "This statement is inaccurate" is where the real inaccuracy is. According to *In re Angstadt*, and the United State Supreme Court in *Minerals Separation v. Hyde* a small number of species in an art such a that to which Appellants' claims are directed is sufficient to enable a claim that includes within its scope that "varies infinitely." As a consequence this Factor supports enablement.

At BD page 37 line 1-13, the second *In re Wand* "Factor (2) the amount of direction or guidance presented:" is applied. *In re Wands* states "The test is not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed" *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988). It is clear from *In re Wands* that guidance is needed only if the experimentation is not routine. There is no evidence in the record that anything other than routine fabrication of sample by known principle is necessary

to make species that come within the scope of Appellants' claims. This is analogous to the invention in *Mineral Separation v. Hyde* where a few examples were sufficient to enable a board claim containing a large class (infinite in number) of substances. The Board's Decision make not mention of the United State Supreme Court decision.. *Mineral Separation v. Hyde*. Why was the broad claim permitted there but not here?

The Board's statement "the Specification contains no direction for making high temperature superconductors e.g., see claims 12 and 88) other than the mixed transition metal oxides" is inaccurate. /First or all there are many moe claim that 12 and 88 that remain rejected and are significantly narrower in scope than claims 12 and 88. Also all of Appellants preferred embodiment come within the scope of claims 12 and 88. Also Secondly the are many thousands or already fabricated materials the merely have to be made by method reported in the literature and tested by known means. The technique is all known. The CAFC in *Genetech* states:

the omission of minor details does not cause a specification to fail to meet the enablement requirement. However, when there is no disclosure of any specific starting material or of any of the conditions under which a process can be carried out, undue experimentation is required; there is a failure to meet the enablement requirement that cannot be rectified by asserting that all the disclosure related to the process is within the skill of the art. It is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement. This specification provides only a starting point, a direction for further research.

Genentech, Inc. v. Novo Nordisk A/S, 108 F.3d 1361, 1366 (Fed. Cir. 1997)

What the Board's Decision says is missing from Appellants teaching are minor details that are not required to be listed. None of these detail are "novel aspects" since they are known to all persons of skill in the art. The Board would

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require a patent applicant to write an encyclopedia of known information into a patent application to get a claim of broad scope. *Genetech* say this is not necessary.

As a consequence this Factor supports enablement.

At BD page 37 lines 14-24, the third *In re Wands* Factor (3) the presence or absence of working examples: is applied. The Board's decision states "that the Specification examples are limited to the mixed transition metal oxides discussed in subsection I. Under these circumstances, a non-enablement conclusion is supported by Factor (3)." In *Mineral Separation v. Hyde* only a small number of examples were sufficient to find enabled a claim to the genus "ore." The facts in the present application are not different. There is no evidence in the record that persons of ordinary skill in the art had or have any difficulty in making and testing species. Just as in *In re Wands*, *In re Angstadt* and *Miner Separation v. Hyde* only routine screening is required which justifies finding broad claim enables. The Board's assertions to the contrary are not based on any facts but only conclusory statement. As a consequence this Factor supports enablement.

At BD page 38 lines 1 -16, the fourth *In re Wands* Factor (4) the nature of the invention: is applied.. Appellants maintain that the invention is easily practice by persons of skill in the art. The Poole 1988 Enablement Statement is clear evidence of this. This is confirmed by the DST Affidavits. (Brief Attachment AM, AN and AO). This is comparable to the invention in *Mineral Separation v. Hyde*. A broad claim was justified there because the invention was easily practiced.. As a consequence this Factor supports enablement.

At BD page 38 line 17 to page 39, line 2, , the fifth *In re Wands* Factor (5) the state of the prior art: is applied. The only evidence in the record is that well known methods to make species that come within the scope of Appellant's claims are needed to make and test samples that come

within the scope of Appellants' claims. The Board's statement to the contrary is factual error. There is no evidence in the record that persons of ordinary skill in the art have any difficulty in making specie that come within the scope of Appellants' claims. All of the claim in subsection III includes within their scope Appellants' specific embodiments described in their Specification. As a consequence this Factor supports enablement..

At BD page 39 line 6 – 13 to page 40, line, line 6, , the sixth *In re Wands* Factor (6) the relative skill of those in the art: is applied. The Board accepts Appellants' definition of persons of skill in the art. The skill in the art of fabricating ceramic material is high. Testing these materials for superconductivity is well understood. As a consequence this Factor supports enablement..

At BD page 40, line 7-13 the seventh *In re Wands* Factor (7) the predictability or unpredictability of the art: is applied. For the reasons given above the art of high  $T_c$  superconductivity is predictable. Appellants disagree with the Board's position. As a consequence this Factor supports enablement..

At BD page 40, line 14 to page 41, line 7 the eight *In re Wands* Factor (8) the breadth of the claims: is applied. As stated above the Board's Decision only selects two claims, 12 and 88, from the many other claim of narrower scope that remain rejected to focus on. Appellants maintain that they are entitled to a claim as broad as their discovery, which is that compounds, such as ceramics, more particularly, oxides, metal oxides, transition metal, etc. can carry a superconductive current for a  $T_c > 26$  K. Finding species is merely a matter of making and testing samples. Claim of this type were found enable in *In re Wands*, *In re*

*Angstadt* and in *Mineral Separation v. Hyde* for similar reasons only routine making and testing is required.. Appellants disagree with Board's statement As a consequence this Factor supports enablement.

Appellants disagree with the Board's statement at BD page 40, 3 line from the bottom to page 41 line 6. :

However, it is important to clarify that the record of this appeal does not support Appellants' implication that the Specification discloses their discovery with sufficient detail to enable those skilled in this art to make and use the full scope of the invention defined by the claims under consideration. As discussed above, Appellants' arguments and evidence of record have little if any value establishing that an artisan would have reasonably believed that Appellants' high temperature superconductivity success with mixed transition metal oxides could be extrapolated with a reasonable expectation of success to the other materials encompassed by the claims of this subsection. For these reasons,

This statement is an error of law since following *In re Wands*, *In re Angstadt* and in *Mineral Separation v. Hyde* as applied in Appellants' Brief and Appellant's Replies Appellants claims are enabled to their full scope.

Factor (8) evinces -enablement.

## CONCLUSION

In view of Appellants arguments in Appellant's Brief, Appellants Replies and this Request for Rehearing. Appellants request the Board to reverse the rejection the claims for which the Board sustained the Examiner Rejections in the Decision on Appeal for which this Request for Rehearing has been

requested.. In particular, Appellants request reconsideration of claims which remain rejected which recite that the high  $T_c$  element "can be made according to known principles of ceramic science" or similar recitation.

These include independent claim 522 and portions of multiply dependent claims 322 to 360, 414 to 427, 436, 453 to 465, 473 to 475, and 484 to 491 which remain rejected. Those that remain rejected are:

326/93, 94, 95

327/64

329/12-23, 110, 131, 133, 337-370

334/275, 310

337/117

338/24-26, 60-63, 116, 141 -143, 187, 222-224, 278, 285, 313, 320

356/126, 127

424/283, 386, 387, 389

427/402

549/496-500, 508

In addition reconsideration is requested of the following independent claims:

- independent claims 59 which is directed to "**a ceramic like material**" and
- independent claim 374 which is directed to "**a material comprising a ceramic characteristic**"

and the following dependent claims which depend therefrom::

Dependent claim 351 depends from claim 59 and states that the "**ceramic like material**" "**can be made according to known principles of ceramic science.**"

Dependent claim 419 depends from claim 374 and states that the "the material comprising a ceramic characteristic" "can be made according to known principles of ceramic science."

Please charge any fee necessary to enter this paper and any previous paper to deposit account 09-0468.

Respectfully submitted,

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ATTACHMENT BN

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

Date: Nov. 13, 2009

Applicants: Bednorz et al.

Docket: YO987-074BZ

Serial No.: 08/479,810

Group Art Unit: 1751

Filed: June 7, 1995

Examiner: M. Kopec

Appeal 2009-003320

For: NEW SUPERCONDUCTIVE COMPOUNDS HAVING HIGH TRANSITION  
TEMPERATURE, METHODS FOR THEIR USE AND PREPARATION

Commissioner for Patents

P.O. Box 1450 Alexandria,

VA 22313-1450

AFFIDAVIT OF DENNIS NEWNS

UNDER 37 C.F.R. 1.132

Sir:

I, Dennis Newns, declare that:

1. I received a B. A. degree in Chemistry from Oxford University United Kingdom in 1964 and a Ph.D. degree in Theoretical Physical Chemistry from the University of London in 1967.
2. I am a theoretical solid state scientist. My resume and curriculum vitae were attached to my prior affidavit dated April 10, 2006 (Prior Affidavit).
3. In my prior affidavit I commented on the USPTO response dated October 20,

2005 (Office Action) which at page 4 regarding the subject application cites Schuller et al "A Snapshot View of High Temperature Superconductivity 2002" (report from workshop on High Temperature Superconductivity held April 5-8, 2002 in San Diego) which the examiner states "discusses both the practical applications and theoretical mechanisms relating to superconductivity."

4. As stated in paragraph 4 of my Prior Affidavit the Examiner at page 4 of the Office Action cites page 4 of Schuller et al which states:

"Basic research in high temperature superconductivity, because the complexity of the materials, brings together expertise from materials scientists, physicists and chemists, experimentalists and theorists... It is important to realize that this field is based on complex materials and because of this materials science issues are crucial. Microstructures, crystallinity, phase variations, nonequilibrium phases, and overall structural issues play a crucial role and can strongly affect the physical properties of the materials. Moreover, it seems that to date there are no clear-cut directions for searches for new superconducting phases, as shown by the serendipitous discovery of superconductivity in  $MgB_2$ . Thus studies in which the nature of chemical bonding and how this arises in existing superconductors may prove to be fruitful. Of course, "enlightened" empirical searches either guided by chemical and materials intuition or systematic searches using well-defined strategies may prove to be fruitful. It is interesting to note that while empirical searches in the oxides gave rise to many superconducting systems, similar (probable?) searches after the discovery of superconductivity in  $MgB_2$  have not uncovered any new superconductors."

5. As stated in paragraph 5 of my Prior Affidavit the Examiner at pages 4 -5 of the Office Action cites pages 5- 6 of Schuller et al which state:

"The theory of high temperature superconductivity has proven to be elusive to date. This is probably as much caused by the fact that in these complex materials it is very hard to establish uniquely even the experimental phenomenology, as well as by the evolution of many competing models, which seem to address only particular aspects of the problem. The Indian story of the blind men trying to characterize the main properties of an elephant by touching various parts of its body seems to be particularly relevant. It is not even clear whether there is a single theory of superconductivity or whether various mechanisms are possible. Thus it is impossible to summarize, or even give a complete general overview of all theories of



superconductivity and because of this, this report will be very limited in its theoretical scope."

5. As stated in paragraph 6 of my Prior Affidavit the Examiner at page 5 of the Office

Action cites page 7 of Schuller et al which states:

"Thus far, the existence of, a totally new superconductor has proven impossible to predict from first principles. Therefore their discovery has been based largely on empirical approaches, intuition, and, even serendipity. This unpredictability is at the root of the excitement that the condensed matter community displays at the discovery of a new material that is superconducting at high temperature."

7. My Prior Affidavit was submitted to clarify what is meant by predictability in theoretical solid state science and to comment on the passages quoted above in paragraphs 4, 5 and 6.
8. I am submitting this affidavit to comment on certain remarks made in the Decision on Appeal of the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office (Board's Decision) dated 09/17/2009.
9. Apparently motivated by my Prior Affidavit and the arguments made by the patent applicants base on my Prior Affidavit the Board's Decision makes the following comments at page 10 in regards to a paragraph from page 7 of the Schuller article (quoted above in paragraph 6):

As support for the finding of unpredictability in the high temperature superconductor art, the Examiner relies on the Schuller article "A Snapshot View of High-Temperature Superconductivity 2002", which discloses:

Thus far, the existence of a totally new superconductor has proven impossible to predict from first principles.

Therefore, their discovery has been based on largely on empirical approaches, intuition, and even serendipity. This unpredictability is at the root of the excitement that the condensed matter community displays at the discovery of a new material that is superconducting at high temperature.(Schuller 7).

10. Boards' Decision page 26, lines 15-19, states

Appellants urge that their predictability position is

supported by Schuller's reference to new superconductor discoveries as based largely on empirical approaches, intuition, and serendipity since these bases are typically used by scientists during the discovery process as evidenced by the Newns affidavit (*id.*). However, Appellants have not established their proposition that predictability is indicated by the use of empirical approaches, intuition, and serendipity in the research and discovery methodology of scientists.

11. The first few sentences of paragraph 7 of my Prior Affidavit states:

I am submitting this declaration to clarify what is meant by predictability in theoretical solid state science. A theory of a solid is based on approximate mathematical formalisms to represent these interactions. A theoretical solid state scientist makes an assessment using physical intuition, mathematical estimation and experimental results as a guide to focus on features of the complex set of interactions that this assessment suggests are dominate [sic., dominant] in their effect on the physical phenomena for which the theorist is attempting to develop a theory. This process results in what is often referred to as mathematical formalism. This formalism is then applied to specific examples to determine whether the formalism produces computed results that agree with measured experimental results. This process can be considered a "theoretical experiment."

12. The last few sentences of paragraph 9 of my Prior Affidavit state referring as an example to a well understood theory in semiconductors :

Moreover, that a theoretical computation is a "theoretical experiment" in the conceptual sense [is] not different than a physical experiment. The theorist starting out on a computation, just as an experimentalist starting out on an experiment, has an intuitive feeling that, but does not know whether, the material studied will in fact be a semiconductor. As stated above solid state scientists, both theoretical and experimental, are initially guided by physical intuition based on prior experimental and theoretical work. Experiment and theory complement each other, at times one is ahead of the other in an understanding of a problem, but which one is ahead changes over time as an understanding of the physical phenomena develops.

These comments equally apply to high  $T_c$  superconductivity.

13. It is my position that the Board's Decision as quoted in paragraphs 9 and 10

above is inconsistent with what I stated in my Prior Affidavit as indicated by the representative examples from my Prior Affidavit quoted in paragraphs 11 and 12 above. I refer the complete text of my Prior Affidavit for all the details.

14. I disagree with the Board's Decision quoted in paragraph 10 above where it states "Appellants have not established their proposition that predictability is indicated by the use of empirical approaches, intuition, and serendipity in the research and discovery methodology of scientists."
15. "Physical intuition" to an experimental scientist is developed from the experimental techniques and apparatus they use and the data that they measure. This is their "empirical approaches."
16. "Physical intuition" to a theoretical scientist is developed from the mathematical and calculation techniques they use (which includes numerical calculations on computers), the equations they develop and the data that they calculate. This is their empirical approaches. Where I use empirical here as I use the term "theoretical experiment" in my Prior Affidavit.
17. Both experimental and theoretical scientists are primarily guided by this developed "physical intuition."
18. A theoretical scientist does not make random calculations and an experimental scientist does not make random experiments. Such a random approach would not result in useful results.
19. When a theoretical scientist chooses to go into a particular theoretical direction or when an experimental scientist chooses to go in a particular experimental direction, that direction is guided by "physical intuition" with a reasonable expectation of success in carrying out the experiment or calculation and arriving at a measured or calculated result
20. Both theoretical and experimental scientists are primarily guided by "physical intuition" which is developed by educational training and the theoretical work or experimental work that they do.
21. When a theoretical or experimental result is achieved, that result is systematically explored to develop a fuller theoretical or experimental understanding which further develops or enhances the scientist "physical intuition."

22. Systematic exploration to a theoretical scientist may for example include varying certain parameters used in a calculation, modifying approximate equations used in the calculation or modifying a numerical computational approach. All of this is done with a reasonable expectation of getting successfully calculated results.
23. Systematic exploration to an experimental scientist may for example include varying certain experimental conditions, e.g. temperature, time, pressure, mix of constituents, etc. used in an experiment in fabricating samples, modifying measurement apparatus to better measure the physical parameters, and measuring more and different physical parameters to get a fuller set of measured data. All of this done with a reasonable expectation of getting successfully fabricated samples and measured results.
24. I turn now to Schuller's use of the term "serendipity."
25. Both experimental and theoretical scientist uses the term "serendipity." But, an experimental or theoretical observation that they make which they refer to as "serendipitous" was not a random calculation, a random fabrication of a sample or a random measurement of a sample. Both the theoretical scientist and the experimental scientist set out based on physical intuition, as I have described it above based on "physical intuition" with a reasonable expectation of success that they would successfully make a sample, measure a sample, or perform a calculation. No reasonable scientist of ordinary scientific skill in their scientific discipline would set out on an experiment, measurement or calculation without a reasonable expectation of success. A reasonable scientist of ordinary scientific skill in a scientific discipline does not perform random and arbitrary experiments, calculations and measurements.
26. The term "serendipity" to a reasonable scientist of ordinary scientific skill in a scientific discipline means that they recognize that based on their "physical intuition" they have chosen the correct direction out of a possibility of many directions that may not have yielded as successful a result.
27. I understand Schuller's use of the term "serendipity or serendipitous" in this context.
28. Thus when Schuller in the section for the Schuller article quoted in paragraph

- 4 above refers to "the serendipitous discovery of superconductivity in  $\text{MgB}_2$ ," he is using the term "serendipitous" in this context and with this meaning,
29. I note that Schuller is not an author on the paper first reporting superconductivity in  $\text{MgB}_2$ . The Schuller article at page 7, first paragraph, refers to reference 8 for the "discovery in 2001[8] of  $\text{MgB}_2$ " being a superconductor. See reference 8 at page 39 of the Schuller article. Schuller is not listed as an author.
30. The Schuller articles characterization of the discovery of superconductivity in  $\text{MgB}_2$  as "serendipitous" is Schuller's statement and not that of the discoverers, i.e. the authors of the article.
31. The authors of the article reporting superconductivity in  $\text{MgB}_2$  may consider it a result of their intuition and systematic study based on the work of the inventors, Bednorz and Mueller, of the above identified patent application.
32. As I stated in paragraph 19 of my Prior Affidavit "Schuller refers the discovery of  $\text{MgB}_2$  citing the paper of Nagamatsu et al. Nature Vol. 410, March 2001 in which the  $\text{MgB}_2$  is reported to have a  $T_c$  of 39 K, a layered graphite crystal structure and made from powders using known ceramic processing methods.  $\text{MgB}_2$  has a substantially simpler structure than the first samples reported on by Bednorz and Muller."
33. I also note that that  $\text{MgB}_2$  was made at least as early as 1954, more than 30 years prior to Bednorz and Mueller's discovery of High  $T_c$  superconductivity, as reported in the following article:

**The Preparation and Structure of Magnesium Boride,  $\text{MgB}_2$**   
Morton E. Jones and Richard E. Marsh  
J. Am. Chem. Soc.; 1954; 76(5) pp 1434 - 1436;

34. I also note that  $\text{MgB}_2$  is layered, which is one of the properties that the Bednorz and Mueller patent application says is a property of the materials that they discovered to be high  $T_c$  superconductors.
35. I also note that Mg and B are elements that are constituents of materials known to be superconductors prior to the discovery of Bednorz and Mueller.
36. Thus to the authors of the article reporting superconductivity in  $\text{MgB}_2$  it may not have been "serendipitous" that a previously made material, that is layered

and made of elements known to have been constituents of known superconductors, were high  $T_C$  superconductors, but that their result was consistent with their intuition.

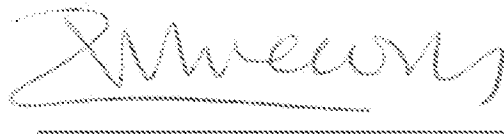
37. I will not repeat here everything that I said in my Prior Affidavit, but refer to it for the details.

38. In closing I note that the concept of a "theory" as used in solid state science or other sciences in the broadest sense refers to the "physical intuition" that a scientist has about a physical phenomenon based on which the scientist forms a "phenomenological understanding" which may not be amenable to being put into an easily used form for straightforward calculation. This "phenomenological" understanding is part of the "physical intuition" that guides both the experimental and theoretical scientist to pursue a particular direction in their research. This is to be contrasted with the more specialized meaning of the term "theory" which I will refer to as a "formal theory" which means formal analytical expressions in mathematical form based on first principles as I described in my Prior Affidavit. Experimental scientists generally do not develop or work on "formal theories" since this requires extensive training in the mathematical formalisms. Theoretical scientists generally do not perform physical experimentation since this requires extensive training in the experimental techniques. As stated above both experimental and theoretical scientists use "physical intuition" and develop and use their own form of "phenomenological theory" which is their physical understanding of a phenomenon which guides them and others working in the field in further research and development. The inventors, Bednorz and Mueller, described their physical understanding of their discovery in their publications and patent application and others used it in looking for other high  $T_C$  superconductors.

27. I hereby declare that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both,

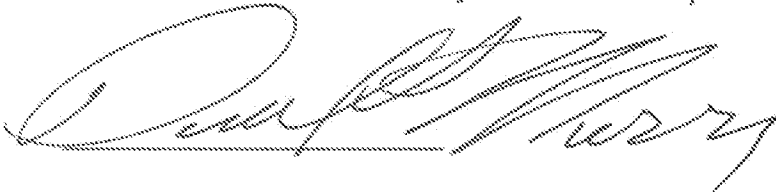
under Section 1001 of Title 18 of the United States Code and that such willful false statements made jeopardize the validity of the application or patent issued thereon.

By:



Dennis News

Sworn to before me this day of Nov. 13, 2009



Daniel P. Morris

DANIEL P. MORRIS  
NOTARY PUBLIC, State of New York  
No. 4888876

Qualified in Westchester County  
Commission Expires March 16, 2011

## ATTACHMENT BO



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

Date: Nov. 16, 2009

Applicants: Bednorz et al.

Docket: YO987-0748Z

Serial No.: 08/479,810

Group Art Unit: 1751

Filed: June 7, 1995

Examiner: M. Kopec

Appeal 2009-003320

For: NEW SUPERCONDUCTIVE COMPOUNDS HAVING HIGH TRANSITION  
TEMPERATURE, METHODS FOR THEIR USE AND PREPARATION

Commissioner for Patents P.O. Box  
1450 Alexandria, VA 22313-1450

**DECLARATION OF GEORG BEDNORZ UNDER**  
**37 C.F.R. 1.132**

Sir:

I, J.Georg Bednorz, declare that:

1. I am a coinventor of the referenced application.
2. I received a M. S. Degree in Mineralogy/Crystallography (1976) from the University of Muenster in Germany and a Ph.D. degree in Natural Science (1982) from the Swiss Federal Institute of Technology (ETH) in Zuerich - Switzerland.
3. I previously submitted a declaration date February 2, 2006. (Prior Declaration)
4. In my Prior Declaration I responded to the USPTO response dated October 20, 2005 at page 7 which cites the following webpage

<http://www.nobelchannel.com/learningstudio/introduction.sps?id=295&eid==0>

Which states

It is worth noting that there is no accepted theory to explain the high-temperature behavior of this type of compound. The BCS theory, which has proven to be a useful tool in understanding lower-temperature materials, does not adequately explain how the Cooper pairs in the new compounds hold together at such high temperatures. When Bednorz was asked how high-temperature superconductivity works, he replied, "If I could tell you, many of the theorists working on the problem would be very surprised."

5. I am submitting this affidavit to comment on certain remarks made in the Decision on Appeal of the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office (Board's Decision) dated 09/17/2009.
6. The Board's Decision states at page 27, lines 3-10, in regards to my Prior Affidavit:

With respect to the Examiner's reliance on the "Exploring

Superconductivity" article as evidencing predictability, Appellants attempt to undermine this evidence via the Bednorz affidavit of record (App. Br., vol. 5, Evidence Appendix, Attachment AQ) which addresses the Bednorz quotation in this article (App. Br., vol. 1, p. 209). Significantly, the Bednorz affidavit fails to address the article disclosure which states that "there is no accepted theory to explain the high-temperature [superconductivity] behavior of this type of compound" ("Exploring Superconductivity", last para.). The absence of such a theory supports the Examiner's unpredictability position.

7. I respectfully disagree that I have attempted to "undermine" what I was reported to have said in the Exploring Superconductivity Article.
8. In the last paragraph of my Prior Declaration I declared that what I stated therein was a true statement. I reaffirm that here.
9. In my Prior Declaration I explain the meaning of the statement attributed to me "If I could tell you, many of the theorists working on the problem would be very surprised" in response to a question from the interviewer about the mechanism of High  $T_c$  superconductivity.
10. It appears from the comment in the Board's Decision quoted in paragraph 6 above that it is not clear what the distinction is between an experimental scientist and a theoretical scientist is and how they think about the research work that they do.
11. The statement attributed to me in the Exploring Superconductivity Article was to my recollection made between October 1987 and December 10 1987. I know it was before December 10, 1987 since that is when the Nobel Prize Award ceremony took place. This was shortly after my co-inventor, Alex Mueller, and I revealed our discovery.
12. Since, as stated in my Prior Declaration, I am an experimental scientist, I would not have stopped my experimental work to work on developing a formal mathematical theory. To do so would have been a professional mistake. It would have required a substantial amount of in mathematical techniques that existing theoretical scientist were expert in. Moreover, by continuing my experimental work I was able to make further contributions to my experimental work.
13. I disagree with the Board's Decision quoted in paragraph 6 above where it states "[s]ignificantly, the Bednorz affidavit fails to address the article disclosure which states that 'there is no accepted theory to explain the high-temperature

[superconductivity] behavior of this type of compound' ('Exploring Superconductivity', last para.). The absence of such a theory supports the Examiner's unpredictability position."

14. It is my position that the statement in the Exploring Superconductivity Article "there is no accepted theory to explain the high-temperature [superconductivity] behavior of this type of compound" as quoted in the Board's Decision is referring to a "formal mathematical theory."

15. I expressed my physical understanding of the phenomenon that I observed in my initial papers and in my patent application.

16. Both experimental and theoretical scientist work by using "physical intuition".

17. "Physical intuition" to an experimental scientist is developed from the experimental techniques and apparatus they use and the data that they measure. This is their "empirical approaches."

18. "Physical intuition" to a theoretical scientist is developed from the mathematical and calculation techniques they use (which includes numerical calculations on computers), the equations they develop and the data that they calculate. This is their empirical approaches. .

19. Both experimental and theoretical scientists are primarily guided by this developed "physical intuition."

20. A theoretical scientist does not make random calculations and an experimental scientist does not make random experiments. Such a random approach would not result in useful results.

21. When a theoretical scientist chooses to go into a particular theoretical direction or when an experimental scientist chooses to go in a particular experimental direction, that direction is guided by "physical intuition" with a reasonable expectation of success in carrying out the experiment or calculation and arriving at a measured or calculated result

22. Both theoretical and experimental scientists are primarily guided by "physical intuition" which is developed by educational training and the theoretical work or experimental work that they do.

23. When a theoretical or experimental result is achieved, that result is

systematically explored to develop a fuller theoretical or experimental understanding which further develops or enhances the scientist "physical intuition."

24. Systematic exploration to a theoretical scientist may for example, include varying certain parameters used in a calculation, modifying approximate equations used in the calculation or modifying a numerical computational approach. All of this is done with a reasonable expectation of getting successfully calculated results.

25. Systematic exploration to an experimental scientist may for example include varying certain experimental conditions, e.g. temperature, time, pressure, mix of constituents, etc. used in an experiment in fabricating samples, modifying measurement apparatus to better measure the physical parameters, and measuring more and different physical parameters to get a fuller set of measured data. All of this done with a reasonable expectation of getting successfully fabricated samples and measured results.


26. In closing I note that the concept of a "theory" as used in solid state science or other sciences in the broadest sense refers to the "physical intuition" that scientist has about a physical phenomenon based on which the scientist forms a "phenomenological understanding" which may not be amenable to being put into an easily used form for straightforward calculation. This "phenomenological" understanding is part of the "physical intuition" that guides both the experimental and theoretical scientist to pursue a particular direction in their research. This is to be contrasted with the more specialized meaning of the term "theory" which I will refer to as a "formal theory" which means formal analytical expressions in mathematical form based on first principles. Experimental scientists generally do not develop or work on "formal theories" since this requires extensive training in the mathematical formalisms. Theoretical scientists generally do not perform physical experimentation since this requires extensive training in the experimental techniques. As stated above both experimental and theoretical scientists use "physical intuition" and develop and use their own form of "phenomenological theory" which is their physical understanding of a phenomenon which guides them and others working in the field in further research and development. My co-inventor, Alex Mueller, and I described our physical understanding of our discovery in our publications and patent application

used it as a guide in looking for other high  $T_c$  superconductors.

27. I hereby declare that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements made jeopardize the validity of the application or patent issued thereon.

Date

11/13/2009

  
J. George Bednorz